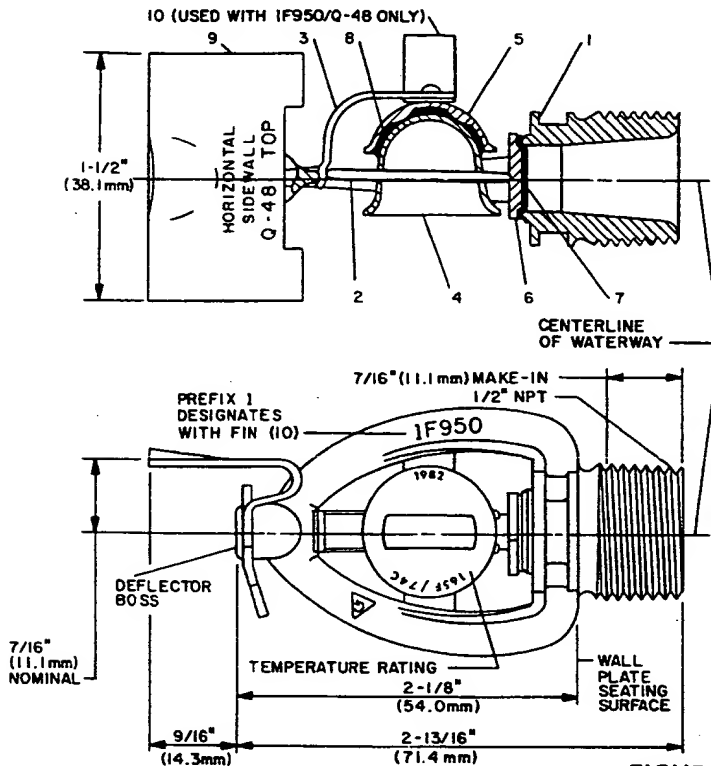




EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

MODELS F950/Q-48 AND 1F950/Q-48, SOLDER TYPE, 1/2" ORIFICE



Components:

- 1—Frame
- 2—Strut
- 3—Hook
- 4—Heat Collector
- 5—Key
- 6—Button
- 7—Gasket
- 8—Solder
- 9—Deflector, E.C. Horizontal Sidewall, Q-48
- 10—Fin

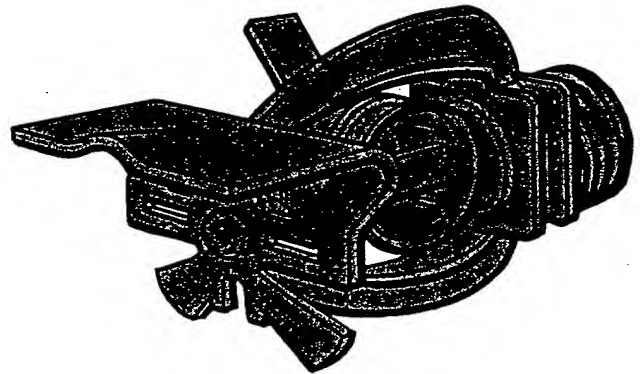


FIGURE A
1/2 INCH ORIFICE MODEL F950/Q-48 AND 1F950/Q-48
EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLER ASSEMBLIES

GENERAL DESCRIPTION

The 1/2 inch orifice Model F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers (Ref. Figure A) are automatic sprinklers of the fusible solder type. They are designed for installation along a wall or the side of a beam and just beneath a smooth and level ceiling. Horizontal sidewall sprinklers are generally used in lieu of pendent or upright sprinklers because of aesthetic, building construction or installation economy considerations.

The Model 1F950/Q-48 sprinkler has a Fin added to the fusible link, in order to provide the thermal response characteristic necessary for use with coverage areas of up to 16 feet wide by 20 feet long.

APPROVALS AND STANDARDS

The 1/2 inch orifice Model F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers

are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada for use in Light Hazard Occupancies.

The listings only apply to the temperature rating, finishes, minimum flow and installation criteria stated in the Technical Data Section.

WARNING

The F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of this device.

The owner is responsible for maintaining his fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.

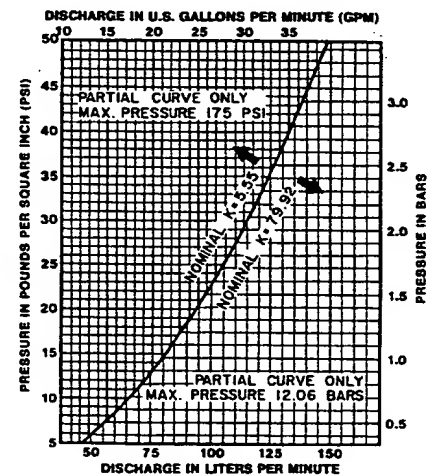


FIGURE B
NOMINAL DISCHARGE CURVE

TECHNICAL DATA

The 1/2 inch orifice Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers are available in a 165F/74C temperature rating with either natural brass or chrome plated finishes. The sprinklers are rated for use at a maximum service pressure of 175 psi.

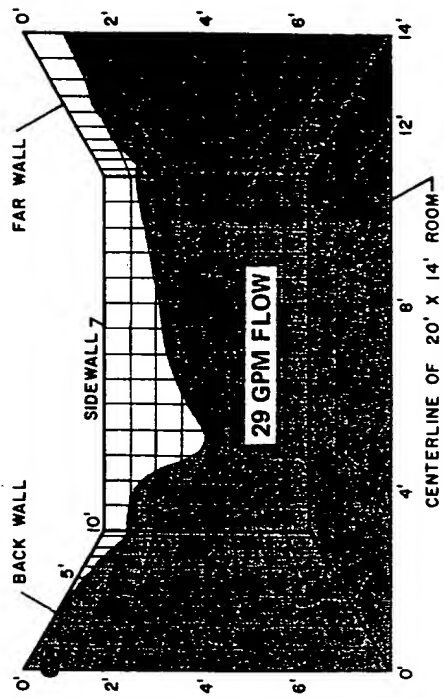
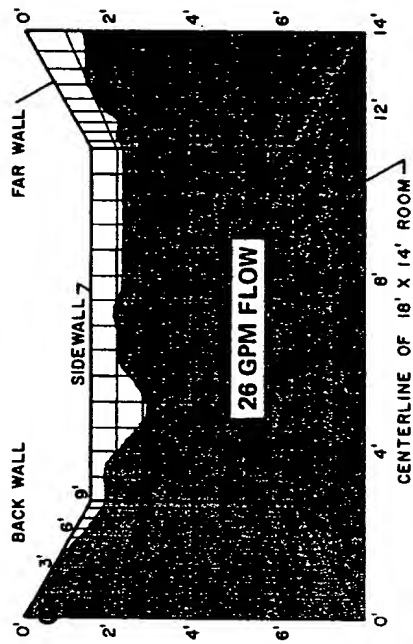
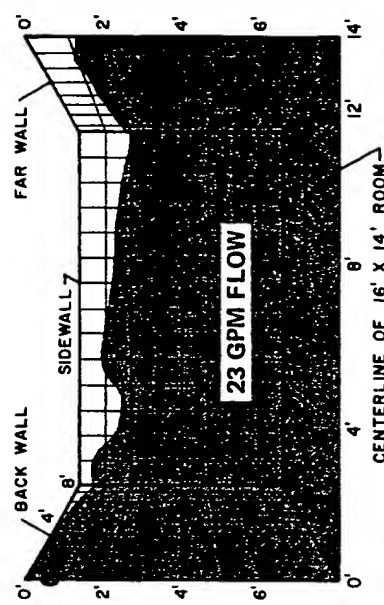
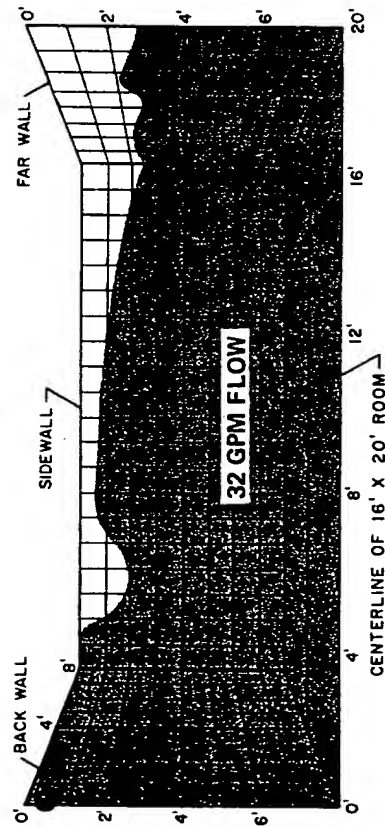
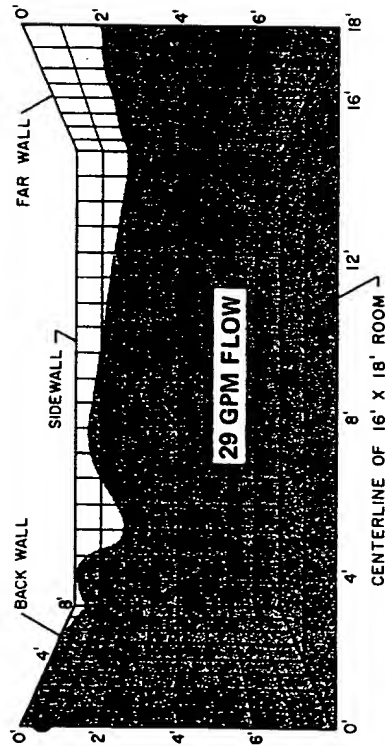
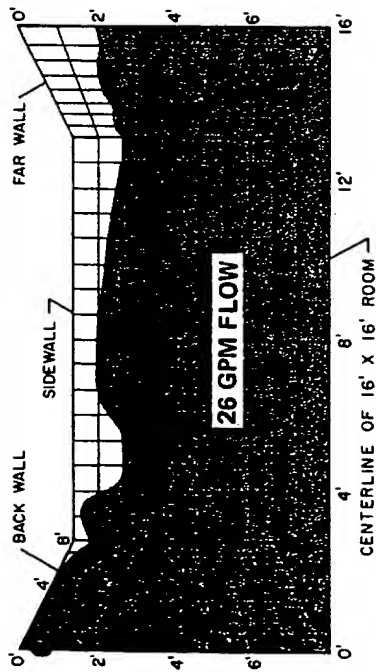
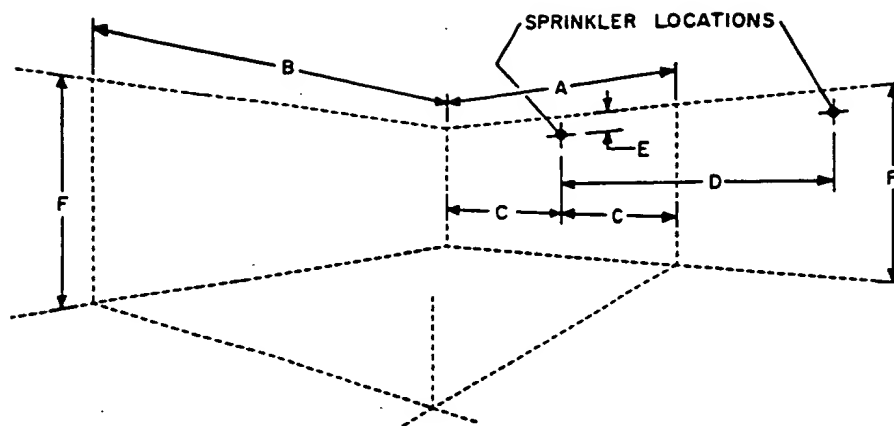


FIGURE C
NOMINAL WETTING PATTERNS AT MINIMUM REQUIRED FLOW CONDITIONS AND DEFLECTOR TO CEILING DISTANCE OF 4 INCHES*

*SEE TECHNICAL DATA AND WARRANTY SECTIONS



A	Maximum width of sprinkler coverage	16 feet	16 feet	16 feet	16 feet	18 feet	20 feet
B	Maximum length of sprinkler coverage	16 feet	18 feet	20 feet ^(a)	14 feet	14 feet	14 feet
	Minimum required flow, (residual pressure) (b.)	26 GPM (21.9psi)	29 GPM (27.3psi)	32 GPM (33.2psi)	23 GPM (17.2psi)	26 GPM (21.9psi)	29 GPM (27.3psi)
C	Maximum distance between sprinkler and adjacent wall or between sprinkler and adjacent sprinkler coverage area	8 feet				9 feet	10 feet
D	Minimum distance between adjacent sprinklers	14 feet					
E	Deflector to ceiling distance (c.)	4 to 6 inches					
F	Maximum ceiling height with one sprinkler per room or compartmented area ^(d)	No Limit					
	Maximum ceiling height with two or more sprinklers in the same room or compartmented area ^(d)	9 feet					

- (a.) The 1F950/Q-48 must be used for maximum sprinkler coverage lengths of more than 18 feet. The F950/Q-48 may be used with maximum sprinkler coverage lengths of up to 18 feet.
- (b.) Requirement is based on minimum flow in GPM. The indicated residual pressures are based on the nominal K-factor.
- (c.) To meet this requirement, the centerline of the sprinkler waterway (Ref. Fig. A) must be installed between 4-7/16 and 6-7/16 inches below the ceiling.
- (d.) Requirement applies when there are two or more extended coverage sprinklers of any type within the same room or compartmented area^(d).

● A compartmented area is a space bound on all sides with walls or with beams or lintels extending at least two inches below the centerline of the waterway of the lowest installed sprinkler.

TABLE A
INSTALLATION CRITERIA FOR 1/2 INCH ORIFICE MODEL F950/Q-48 AND 1F950/Q-48
EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

The nominal discharge curve plotted in Figure B represents the flow "Q" in U.S. gallons per minute (gpm) as determined by the formula: $Q = K\sqrt{p}$ where the nominal sprinkler discharge coefficient is "K" and "p" = pressure

in pounds per square inch (psi). Listing standards permit the actual value of "K" to vary from 5.3 to 5.8.

Material specifications for Components 1 thru 8 are the same as for the

1/2 inch orifice F950 Upright and Pendent Sprinklers described in TD517. The Deflector is brass per ASTM B36 (C22000) and the Fin which is utilized with the 1F950/Q48 is copper per ASTM B152 (C11000).

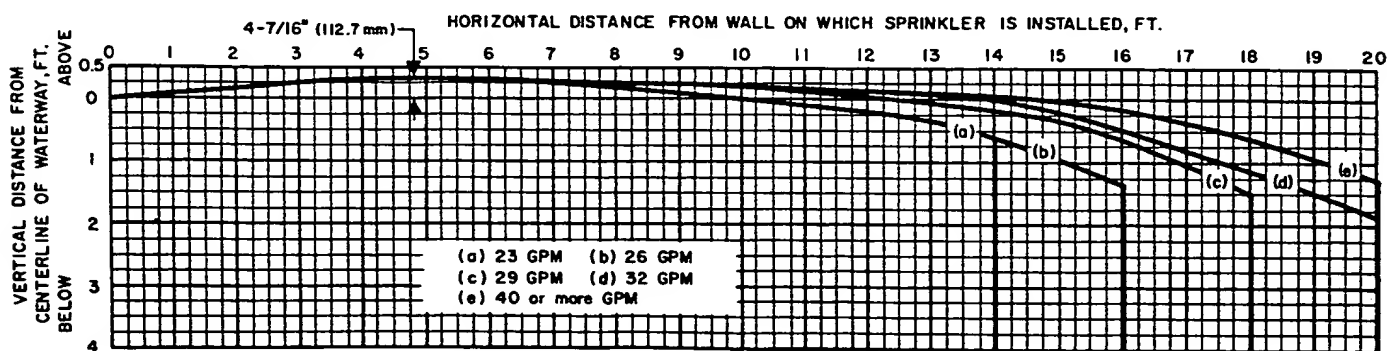


FIGURE D, UPPER LIMIT OF WATER SPRAY*



E. C. HOR. SIDEWALL SPRINKLER, F950/Q-48 & 1F950/Q-48, 1/2" ORIFICE

The ULI and ULC Listings for the 1/2 inch orifice Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers only apply to their use in Light Hazard Occupancies, under smooth and level ceilings, and in accordance with the installation criteria given in Table A. The F950/Q-48 may be used for maximum sprinkler coverage lengths of 18 feet. The 1F950/Q-48 must be used for maximum sprinkler coverage lengths of more than 18 feet.

NOTE

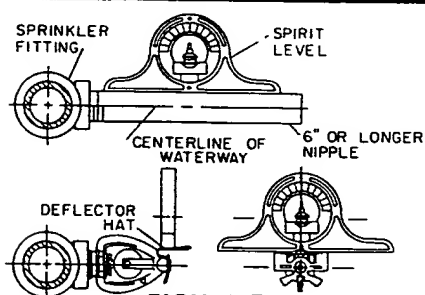
For coverage area dimensions less than or between those indicated in Table A, it is necessary to use the minimum required flow for the next highest width (A) and length (B) for which installation criteria are stated.

The nominal wetting patterns are illustrated in Figure C for the minimum flows required with each coverage area.

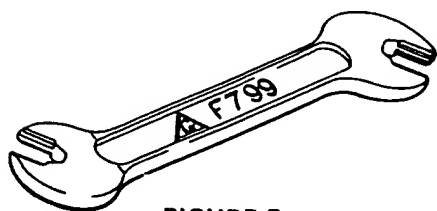
Figure D illustrates the upper limit of the water spray as a function of flow. The sprinkler must be spaced away from beams and other ceiling obstructions such that they will not interfere with the proper distribution of water by the sprinkler.

NOTE

Ceiling obstructions must be spaced above the "Upper Limit of Water Spray" which is associated with the maximum flow (residual pressure) for single sprinkler operation.



**FIGURE E
LEVELING OF
SPRINKLER FITTING
AND DEFLECTOR HAT**



**FIGURE F
OFFSET SPRINKLER WRENCH**

Soffits used for the installation of Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers are to be a maximum of 6 inches wide (distance from wall).

NOTE

Soffits wider than 6 inches are permitted if additional sprinkler protection is provided for the area below the soffit.

INSTALLATION

The 1/2 inch orifice Model F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers must be installed with the centerline of the waterway horizontal and perpendicular to the back wall surface. The word "TOP" on the Deflector must face upwards toward the ceiling.

It is recommended that a light weight spirit level (less than 1 pound), be used to level the sprinkler fitting and the sprinkler Deflector Hat, as shown in Figure E, and that a square be used to check perpendicularity of the waterway centerline to the back wall.

NOTE

The Deflector Hat has a raised portion at the front. Consequently, the spirit level must be carefully positioned on the rear-flat portion of the Deflector Hat.

Only use the Model F799 Offset Sprinkler Wrench shown in Figure F for installation of the sprinkler.

CARE AND MAINTENANCE

Automatic sprinklers must never be shipped or stored where their temperatures will exceed 100F/38C and they must never be painted, plated, coated or otherwise altered after leaving the factory. Modified or over-heated sprinklers must be replaced.

Care must be exercised to avoid damage to the sprinklers — both before and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

NOTE

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may

be affected by this action must be notified.

It is recommended that automatic sprinkler systems be inspected quarterly by a qualified Inspection Service.

WARRANTY

The data provided in Figure C is not intended for use as a minimum wetting pattern specification and the data given in Figure D is not intended for use as a minimum water spray profile specification.

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

Sprinkler Assemblies:

Specify: 1/2 inch orifice, 165F, Model (specify F950/Q-48 or 1F950/Q-48) E. C. Horizontal Sidewall Sprinkler with (specify type of finish), PSN (specify).

Model F950/Q-48

Natural Brass Finish...PSN 50-957-1-165
Chrome Plated Finish...PSN 50-957-9-165

Model 1F950/Q-48

Natural Brass Finish...PSN 50-959-1-165
Chrome Plated Finish...PSN 50-959-9-165

Separately Ordered Parts:

Specify: Model F799 Offset Sprinkler Wrench, PSN 56-452-1-001.

PATENTS

The following patents are applicable to the Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers:

COUNTRY	PATENT NO.
U.S.A.	4,296,815
U.S.A.	4,296,816
United Kingdom	2,103,480
United Kingdom	2,103,481

CONVERSION FACTORS

Parentetical metric conversions cited herein are approximate.

1 inch	=	25.400 mm
1 foot	=	0.3048 m
1 psi	=	6.895 kPa
	=	0.0689 bar*
	=	0.0703 kg/cm ² *
1 lb.	=	0.4536 kg
1 U.S. gallon	=	3.785 dm ³
	=	3.785 litres*

*Not recognized International System units.



HORIZONTAL SIDEWALL SPRINKLERS, RES/QR-EC

MODEL FR-1, FAST RESPONSE SOLDER TYPE, 1/2" (15 mm) ORIFICE

GENERAL DESCRIPTION

The 1/2 inch (15 mm) orifice, Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers (Ref. Figure A) are automatic sprinklers of the fusible solder type. They are intended to be used in

- wet pipe residential sprinkler systems for one- and two-family dwellings and mobile homes per NFPA 13D,
- wet pipe residential sprinkler systems for residential occupancies up to four stories in height per NFPA 13R,
- wet pipe sprinkler systems for the residential portions of any occupancy per NFPA 13,
- light hazard, quick response — extended coverage (QR-EC) sprinkler system applications per NFPA 13 or FM installation standards, or
- light hazard, extended coverage (EC) sprinkler system applications per NFPA 13 or FM installation standards.

They are designed for installation along a wall or lintel and just beneath a smooth ceiling. Horizontal sidewall sprinklers are generally used in lieu of pendent or upright sprinklers because of aesthetic, building construction, or installation economy considerations.

The FR-1 Sprinklers have been designed to operate with a particular fusible element temperature rating and heat sensitivity characteristic, as well as to discharge water in a specific pattern and quantity per square foot relationship. The combination of the performance characteristics which are associated with the FR-1 Sprinklers have been proven to help in the control of residential type fires and, therefore, to improve the chance for occupants to escape or be evacuated.

Fire sprinkler systems are not a substitute for intelligent fire safety awareness or construction materials and practices required by building codes.

Components:

- 1 - Frame
- 2 - Strut
- 3 - Deflector
- 4 - Hook
- 5 - Link
- 6 - Ejection Spring
- 7 - Button
- 8 - Gasket

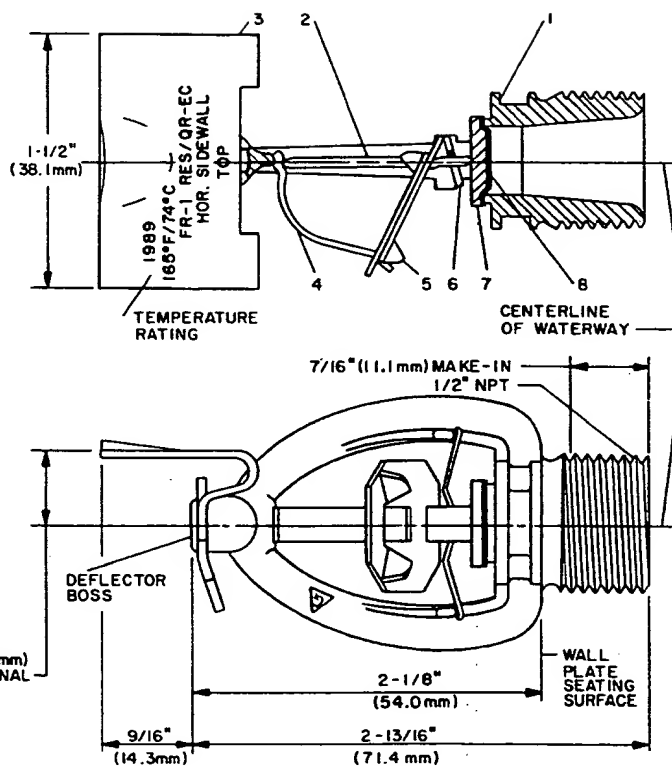
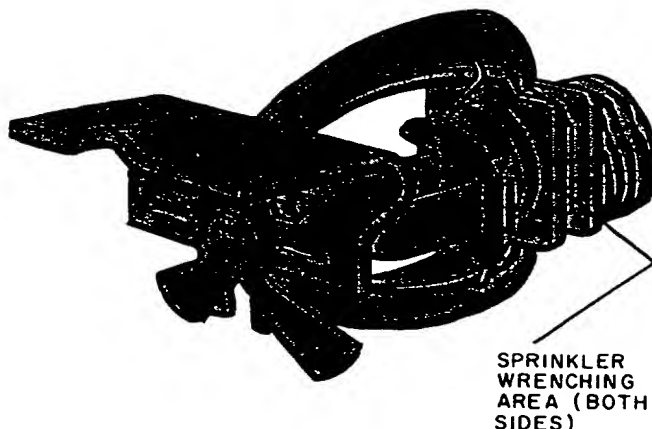


FIGURE A
1/2 INCH (15 mm) ORIFICE MODEL FR-1 RES/QR-EC
HORIZONTAL SIDEWALL SPRINKLERS

APPROVALS AND STANDARDS

The 1/2 inch (15 mm) orifice, Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers are listed by Underwriters Laboratories Inc. and Underwriters Laboratories of Canada, and they are

approved by Factory Mutual Research Corporation. The listings and approval only apply to the service conditions indicated in the General Technical Data and Installation/Usage sections.

The 1/2 inch (15 mm) orifice, Model FR-1 RES/QR-EC Horizontal Sidewall

APPLICATION	COVERAGE AREA W x L FT. x FT. (m x m)	MINIMUM FLOW ^(c) GPM (LPM)	MINIMUM PRESSURE ^(c) PSI (BAR)	DEFLECTOR-TO- CEILING DISTANCE A ^(e) INCHES (mm)	SPRINKLER TEMP. RATING °F	MAX. CEILING SLOPE IN./FT. (mm/m)
RES ^(a)	12 x 12 (3,7 x 3,7)	21/17 (80/64) ^(d)	14.1/9.2 (0,97/0,63) ^(d)	4 to 6 (100 to 150)	165	0
	16 x 20 (4,9 x 6,1)	40/37 (151/140) ^(d)	51.0/43.7 (3,52/3,01) ^(d)	4 to 6 (100 to 150)	165	0
QR-EC ^(b)	16 x 18 (4,9 x 5,5)	29 (110)	26.8 (1,85)	4 to 12 (100 to 300)	165	0
	16 x 20 (4,9 x 6,1)	33 (125)	34.7 (2,39)	4 to 12 (100 to 300)	165	0
	18 x 16 (5,5 x 4,9)	29 (110)	26.8 (1,85)	4 to 12 (100 to 300)	165	0

NOTES:

- (a) Wet pipe fire sprinkler systems in the residential portions of any occupancy per NFPA 13, in one- and two- family dwellings and mobile homes per NFPA 13D, or residential occupancies per NFPA 13R.
- (b) For use in QR-EC and EC Light Hazard Occupancy automatic sprinkler system applications per NFPA 13.
- (c) UL and ULC requirement are based on minimum flow in GPM from each sprinkler. The residual pressures are indicated for reference purposes and are based on a nominal K-factor of 5.6 (80,7).
- (d) Single Head/Multiple Head flow rates [for example: the minimum single sprinkler flow rate is 21 GPM (80 LPM) and the minimum multiple sprinkler flow rate is 17 GPM (64 LPM) per sprinkler for a maximum coverage area of 12' x 12' (3,7 m x 3,7 m)]. Refer to Hydraulic Design Criteria under Residential Installation/Usage Criteria Section for details.
- (e) The centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Ref. Figure A).

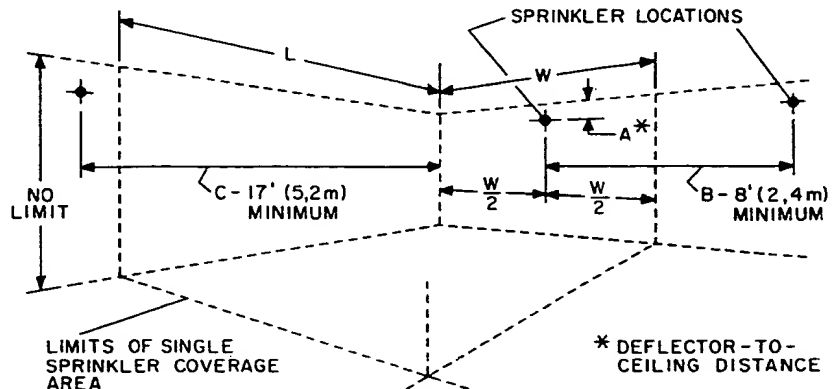


TABLE A-1
UL AND ULC LISTING CRITERIA FOR INSTALLATION OF THE
1/2 INCH (15 mm) ORIFICE MODEL FR-1 HORIZONTAL SIDEWALL SPRINKLERS

Sprinklers are approved by the New York City Board of Standards and Appeals under Calendar Number 334-79-SA.

The 1/2 inch (15 mm) orifice, Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers are also approved by the Verband der Sachversicherer for use in accordance with special installation standards that are not incorporated in this technical data sheet. Refer inquiries on the VdS approval and standards to Grinnell Sales & Distribution, Enschede, Holland, Tel. 31-53-283-434 / Fax. 31-53-283-377.

Any questions concerning an interpretation of NFPA 13, 13D, or 13R sprinkler system design/installation standards, as well as requests for system design/installation standards not presently covered by NFPA 13, 13D, or 13R, should be addressed to the:

Secretary, Standards Council
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

WARNINGS

The Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

Because of the above cited stipulations and the varied nature of residential type architecture, there will be some compartment designs which cannot be fully sprinklered in accordance with the recommendations of NFPA 13, 13D, or 13R. In the event of this condition, consult the authorities having jurisdiction for guidance.

It is the responsibility of an installing contractor to provide a copy of this document to the owner or his representative and, in turn,

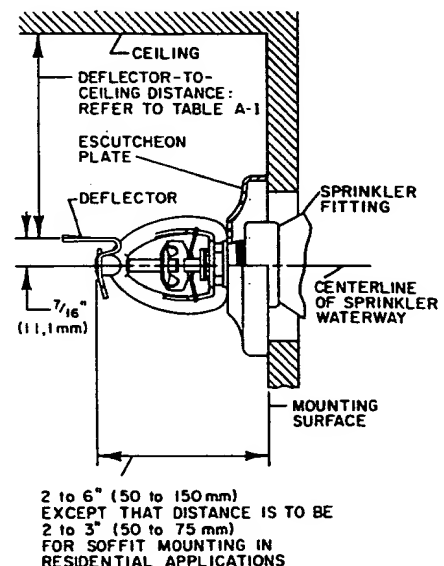


FIGURE B-1
WALL MOUNTING DIMENSIONS
FOR INSTALLATIONS PER
NFPA STANDARDS

APPLICATION	COVERAGE AREA W x L FT. x FT. (m x m)	MINIMUM FLOW ^(b) GPM (LPM)	MINIMUM PRESSURE ^(b) PSI (BAR)	DEFLECTOR-TO- CEILING DISTANCE A ^(c) INCHES (mm)	SPRINKLER TEMP. RATING °F	MAX. CEILING SLOPE IN./FT. (mm/m)
QR-EC ^(a)	16 x 16 (4,9 x 4,9)	26 (98)	22 (1,51)	4 to 12 (100 to 300)	165	1 (83)
	16 x 18 (4,9 x 5,5)	30 (114)	29 (2,00)	4 to 12 (100 to 300)	165	1 (83)
	16 x 20 (4,9 x 6,1)	33 (125)	35 (2,41)	4 to 12 (100 to 300)	165	1 (83)

NOTES:

(a) For use in QR-EC and EC Light Hazard Occupancy automatic sprinkler system applications per FM installation standards. (Maximum room size: 1600 ft² (150 m²) except for corridors protected by one row of sprinklers. Minimum fire-resistance rating of room walls: 30 minutes.)

(b) FM requirement is based on maintaining both minimum flow and minimum pressure.

(c) The centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Ref. Figure A).

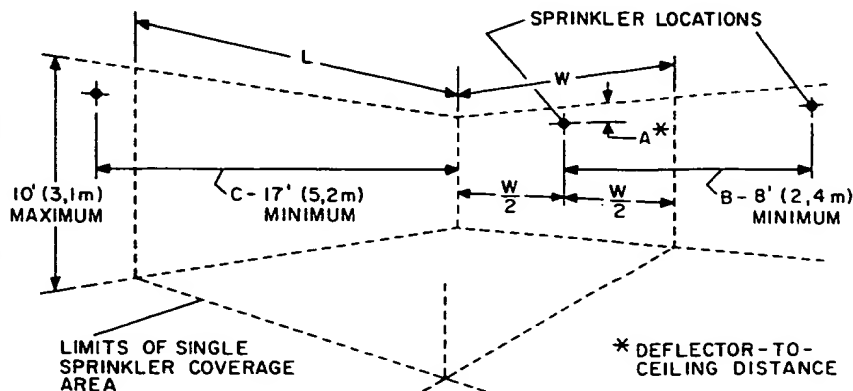


TABLE A-2
FM APPROVAL CRITERIA FOR INSTALLATION OF THE
1/2 INCH (15 mm) ORIFICE MODEL FR-1 HORIZONTAL SIDEWALL SPRINKLERS

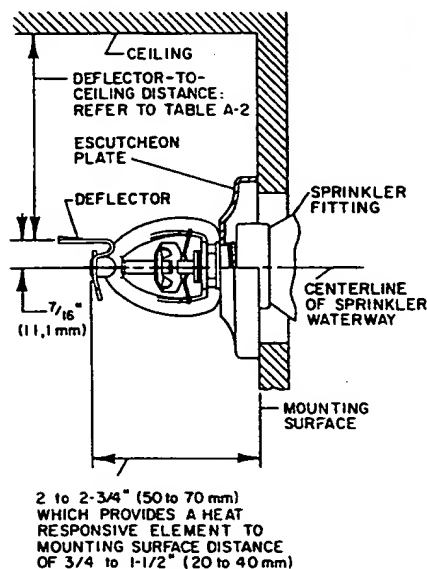


FIGURE B-2
WALL MOUNTING DIMENSIONS
FOR INSTALLATIONS PER
FM STANDARDS

it is the obligation of the owner to provide a copy of this document to a succeeding owner.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

GENERAL TECHNICAL DATA

Sprinkler Assemblies:

The 1/2 inch (15 mm) orifice Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers are available in a 165°F/74°C temperature rating with natural brass or chrome plated finishes. The Link Assembly for both finishes is provided with a black coating, for minimum obtrusiveness. The FR-1 Sprinklers are rated for use at a maximum service pressure of 175 psi (12,1 bar).

The nominal discharge curve plotted in Figure C represents the flow "Q" in GPM (LPM) as determined by the following formula:

$$Q = K\sqrt{p}$$

where the nominal discharge coefficient "K" equals 5.6 (80,7); and, "p" equals the residual flowing pressure in psi (bar). Listing standards permit the actual "K" to vary from 5.3 to 5.8 (76,4 to 83,6).

The Frame of the FR-1 is a die cast bronze per ASTM B176 (C87800). The Strut is silicone bronze per ASTM B97 (C65500), and the Deflector is brass per ASTM B36 (C22000). The Hook is phosphor bronze per ASTM B159 (C51000), the two halves of the Link Assembly are nickel, the Ejection Spring is Inconel 600 wire per ASTM B166, and the Button is brass per ASTM B326 (C22000). The Gasket material is Teflon[†].

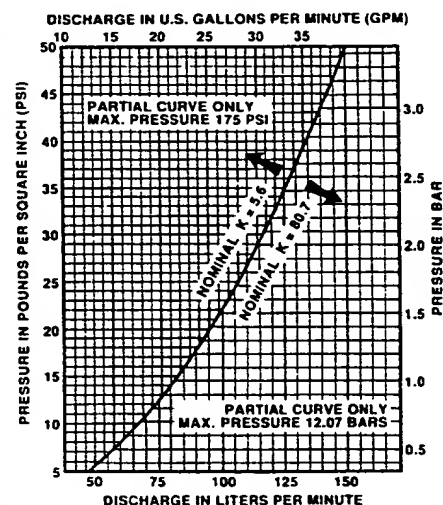
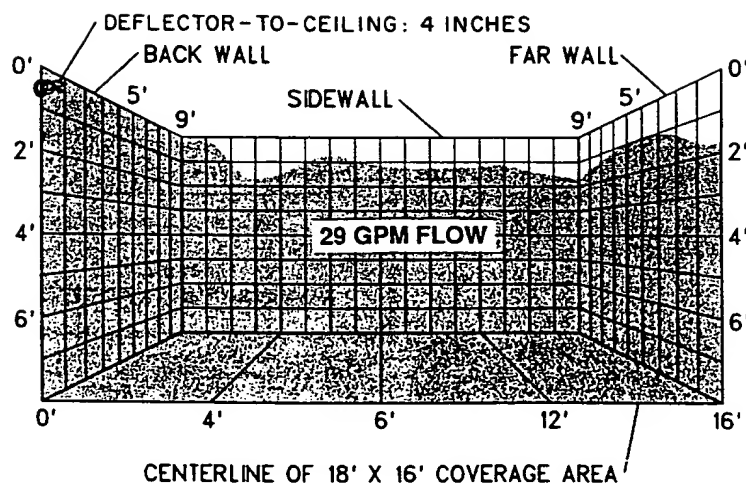
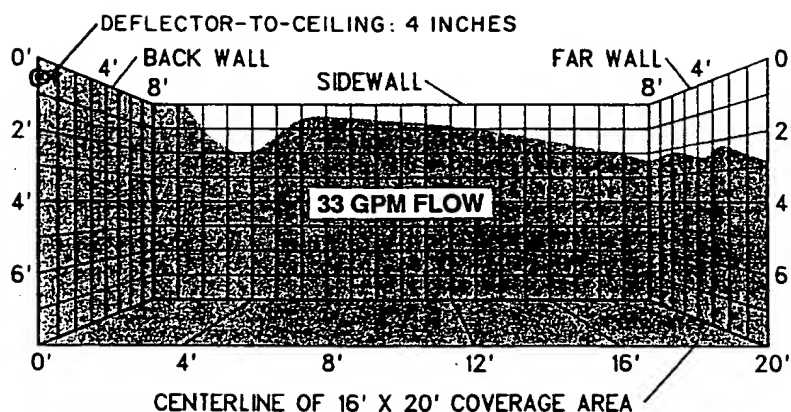
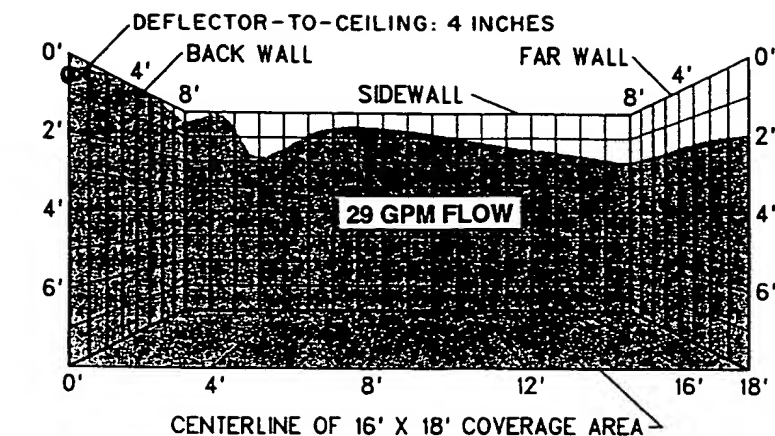


FIGURE C
NOMINAL DISCHARGE CURVE

The Link Assembly has a thin, black, resin type coating which will protect the Link Assembly from deterioration which could otherwise be caused by normal atmospheres. The coating is not intended to provide protection against attack by corrosive media.

Escutcheon Plates:

Figures B-1 and B-2, as applicable, provide wall mounting dimensions for the FR-1 Sprinkler and illustrate the use of a standard one-piece escutcheon plate like that described in Technical Data Sheet TD805. TD805 also describes a flush two-piece escutcheon plate that may be used with the 1/2 inch (15 mm) orifice FR-1.



NOTES:

1. Patterns shown with no ceiling mounted obstructions.
2. See QR-EC & EC Installation/Usage Criteria and Warranty Sections.

FIGURE D
NOMINAL WETTING PATTERNS AT UL AND ULC LISTED
MINIMUM FLOW RATES FOR QR-EC AND EC APPLICATIONS

FR-1 Sprinklers may be installed in a split type escutcheon plate like that described in TD815. The split type plate is suitable for use with plastic pipe fire protection systems when it is installed in accordance with the instructions given in TD815.

NOTES

The standard and flush type escutcheon plates like those shown in Technical Data Sheet TD805 can NOT be used to hold the FR-1 in position. The FR-1 must be secured in position by firmly fastening the sprinkler system piping to the dwelling structure. If the FR-1 is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and water distribution pattern.

Only use escutcheon plates that will provide a deflector-to-mounting surface distance within the range specified in Figure B-1 or B-2, as applicable.

Only use escutcheon plates which consist of metallic materials that will not deform or dislodge at a temperature of less than 1200°F/649°C and/or which have been listed by Underwriters Laboratories Inc. for fire protection service.

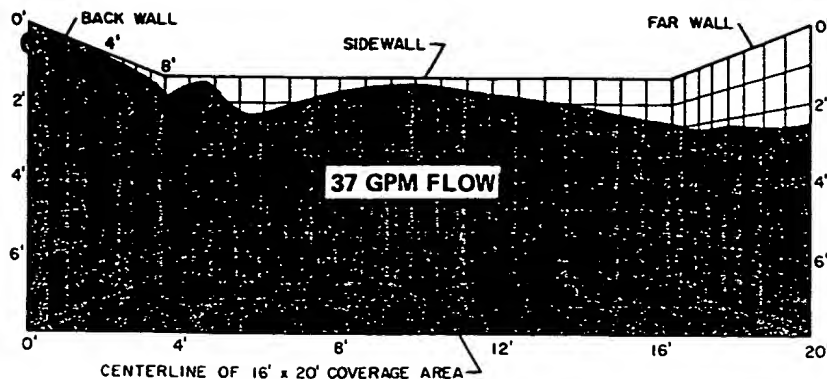
QR-EC & EC
INSTALLATION/USAGE CRITERIA

When used in QR-EC (quick response — extended coverage) or EC (extended coverage) applications, the 1/2 inch (15 mm) orifice, Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers must only be installed and utilized in Light Hazard Occupancies, under smooth ceilings and in accordance with the criteria given in Table A-1 or A-2, as applicable. The nominal wetting patterns are illustrated in Figure D for the minimum flows required for typical coverage areas.

NOTE

For coverage area dimensions less than or between those indicated in Table A-1 or A-2, it is necessary to use the minimum required flow for the next highest width (W) and length (L) for which installation criteria are stated.

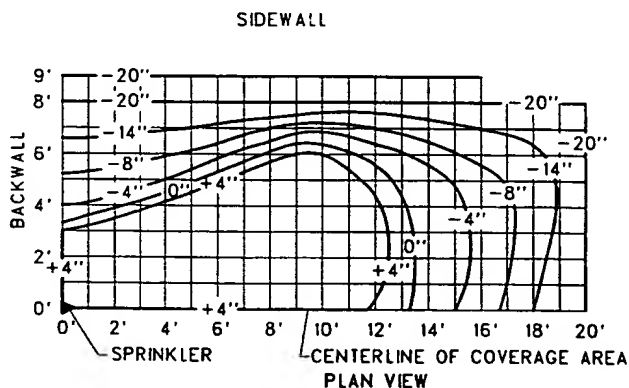
Ceiling mounted obstructions such as heating or air conditioning diffusers, overhangs, and light fixtures must be located above an elevation, as shown in Figure F, where they will not inter-



NOTES:

1. Pattern shown with no ceiling mounted obstructions.
2. See Residential Installation/Usage Criteria and Warranty Sections.
3. Data shown for centerline of sprinkler waterway to ceiling distance of 4-7/16" (112,7 mm).

FIGURE E
NOMINAL WETTING PATTERN AT MINIMUM REQUIRED
MULTIPLE SPRINKLER FLOW FOR 16' x 20' (4,9 m x 6,1 m)
RESIDENTIAL APPLICATIONS



NOTES:

1. For a given position within the coverage area, ceiling mounted obstructions must not hang below the elevation dimension given in the graph.
2. Elevation dimensions are with respect to the top of the Deflector Hat (ref. Fig. A), where positive (+) dimensions are above the Deflector Hat and negative (-) dimensions are below. (Reference: the Deflector Hat is 7/16" (11,1mm) above the sprinkler centerline of waterway.)

FIGURE F
ALLOWABLE ELEVATION FOR CEILING MOUNTED OBSTRUCTIONS
SUCH AS HEATING OR AIR CONDITIONING DIFFUSERS, OVERHANGS,
AND LIGHT FIXTURES

ferre with the proper distribution of water by the sprinkler.

NOTE

The FR-1 Sprinklers must NOT be used with beams, joists, or ducts located within the sprinkler coverage area. They may be located along the boundaries separating adjacent sprinkler coverage areas.

RESIDENTIAL
INSTALLATION/USAGE CRITERIA

When used in residential applications per NFPA 13, 13D, or 13R, the 1/2 inch (15 mm) orifice, Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers must only be installed and utilized in accordance with the following described criteria which are provided by the manufacturer.

These restrictions relate to

- the general service conditions nec-

essary to sprinkler performance and integrity,

- the minimum amount of water which must be discharged from an operating sprinkler,
- the maximum area which can be covered by the spray from an operating sprinkler,
- installation requirements necessary to the proper operational sensitivity of the sprinklers,
- preventing the wetting (i.e., cold soldering) of the fusible Link Assembly of a non-operated sprinkler, which is adjacent to one which has operated, and
- preventing the weakening followed by the possible release of a sprinkler's fusible Link Assembly, due to exposure to heat sources other than abnormal fire.

NOTES

1. Residential Fire Sprinkler Systems should only be designed and installed by those competent and completely familiar with automatic sprinkler system design, installation procedures, and techniques.

2. Several criteria may apply to the installation and usage of each sprinkler. Consequently, it is recommended that the sprinkler system designer review and develop a working understanding of the complete list of criteria, prior to initiating the design of the sprinkler system.

3. Questions concerning sprinkler installation and usage criteria, which are not covered by the following instructions, should be mailed to the attention of the Technical Data Department. Include sketches and technical details, as appropriate.

4. In some instances, the requirements of this document may concern specifications which are more stringent and which take precedence over those specified in NFPA 13, NFPA 13D, NFPA 13R, or by the authority having jurisdiction.

General Service Conditions

The FR-1 Sprinklers must only be utilized

1. in wet pipe automatic sprinkler systems,

2. within residential portions of any occupancy per NFPA 13, within residential "Dwelling Units" per NFPA 13D, or within residential occupancies per NFPA 13R.
3. at a maximum service pressure of 175 psi (12,1 bar),
4. at a maximum ambient temperature of 100°F/38°C,
5. with all interconnecting system piping, as well as sprinklers maintained at a minimum temperature of 40°F/4°C, and
6. with water supplies which are substantially free of contaminants and particles of a size greater than 1/8 inch (3,2 mm).

Hydraulic Design Criteria

The minimum required single and multiple sprinkler flow rates are given in Table A-1 as a function of the maximum allowable coverage areas. The single sprinkler flow rate is the minimum required discharge from the most hydraulically demanding single sprinkler and, the multiple sprinkler flow rate is the minimum required discharge from each of the total number of "design sprinklers" (as specified in NFPA 13, 13D, or 13R).

NOTE

The number of sprinklers within each compartment must be as few as possible. Do NOT use more sprinklers than necessary to cover a particular space.

Spray Coverage Criteria

Each FR-1 Sprinkler must only be used in accordance with one of the designated width by length (W x L) coverage criteria specified in Table A-1. The nominal wetting pattern for FR-1 Sprinklers at minimum required multiple sprinkler flow conditions for a 16' x 20' (4,9 m x 6,1 m) coverage area is illustrated in Figure E.

Ceiling mounted obstructions such as heating or air conditioning diffusers, overhangs, and light fixtures must be located above an elevation, as shown in Figure F, where they will not interfere with the proper distribution of water by the sprinkler.

FR-1 Sprinklers may be installed along overhangs or soffits that are a maximum of 6 inches (152 mm) wide (distance from wall) and, with a maximum distance of 6 inches (152 mm) from the centerline of the sprinkler waterway to the bottom of the overhang/soffit.

NOTES

When installed along overhangs or soffits, the deflector-to-mount-

ing surface distance must be a minimum of 2 inches (51 mm) and a maximum of 3 inches (76 mm) (Ref. Figure B-1).

Use of overhangs and soffits wider than 6 inches (152 mm) is permitted if additional sprinkler protection is provided for the area below the overhang/soffit.

The FR-1 Sprinklers must NOT be located

- a. along a wall/partition having a recessed range oven, countertop, or alcove,
- b. along a wall/partition having an adjoining wood or coal burning stove, or
- c. along a wall/partition containing a fireplace or wall oven.

NOTE

The spray from the FR-1 is distributed radially outward from the sprinkler deflector. Sprinklers must be located such that there will NOT be any blind spaces shielded from spray by partitions or a portion of the dwelling structure.

Operational Sensitivity Criteria

The FR-1 Sprinklers must only be installed

1. beneath level ceilings,
2. beneath solid ceilings having a smooth or textured surface,
3. with a deflector-to-mounting surface distance of 2 to 6 inches (51 to 152 mm) for wall mounting and 2 to 3 inches (51 to 76 mm) for soffit mounting (Ref. Figure B-1),
4. with deflector to ceiling distance of 4 to 6 inches (100 to 150 mm) (Ref. Table A-1), and
5. at least 4 inches (102 mm) away from an inside or outside corner.

The FR-1 Sprinklers must NOT be used

- a. beneath soffits,
- b. above or below open-gridded type suspended ceilings, or
- c. with beams, joists, or ducts located within the sprinkler coverage areas.

NOTE

Beams, joists, or ducts may be located with their centerlines along the boundaries separating adjacent sprinkler coverage areas.

It is recommended that as part of the sprinkler system design, the designer review the dwelling plans and, where appropriate, advise the owner or his representative as to the following.

- I. Lintels of at least 5 inches (127 mm) in height and preferably 8 inches (203 mm) should be used over all passageways from one space to another, in order to reduce the possibility of sprinkler operations outside the fire area.
- II. Beams of at least 5 inches (127 mm) in height should be used to border each of 3 or more adjoining areas of FR-1 sprinkler coverage (within the same compartment), in order to decrease the time to first sprinkler operation as well as to reduce the possibility of multiple sprinkler operations.

Cold Soldering Criteria

With reference to Table A-1, the FR-1 Sprinklers must be located such that

1. the minimum lateral distance "B" between adjacent sprinklers is 8 ft. (2,4 m), and
2. the minimum distance "C" between sprinklers located opposite or with their waterway centerlines at 90 degrees to each other is 17 ft. (5,2 m), except where a portion of the dwelling structure or a partition will shield the spray of one sprinkler from the other.

Heat Source Criteria

The FR-1 Sprinklers must NOT be located

1. where the ambient temperature will exceed a temperature of 100°F/38°C,
2. where they will be exposed to the rays of the sun passing through glass or plastic skylights,
3. in an unventilated compartment containing a furnace or water heater,
4. within 24 inches (610 mm) of the outside edge of a ceiling mounted, downward discharging heating diffuser, or
5. above or within 24 inches (610 mm) of the left or right edges of a wall mounted, horizontal discharging diffuser.

The sprinkler system piping must NOT be

- a. run through heating ducts, or
- b. connected to the domestic hot water system.

INSTALLATION

NOTE

Residential Fire Sprinkler Systems should only be designed and installed by those competent and completely familiar with automatic sprinkler system design, installation procedures, and techniques.

The Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers must be installed in accordance with the following instructions.

1. Prior to installing each sprinkler, verify that the outer face of the mating fitting is within the proper range of distance from the mounting surface which can be accommodated by the particular type of escutcheon plate being used. In addition, verify that the deflector-to-mounting surface distance will be within the range specified in Figure B-1 or B-2, as applicable.

Refer to Technical Data Sheet TD815 for installation information on the Split Type Escutcheon Plate which is suitable for securing the FR-1 to its mounting surface in plastic pipe fire protection systems.

NOTE

The standard and flush type escutcheon plates like those shown in Technical Data Sheet TD805 can NOT be used to hold the FR-1 in position. The FR-1 must be secured in position by firmly fastening the sprinkler system piping to the dwelling structure. If the FR-1 is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and water distribution pattern.

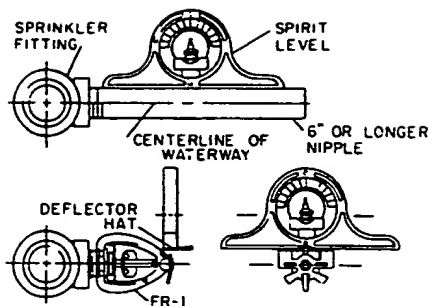
2. The FR-1 must be installed with the centerline of the waterway horizontal and perpendicular to the backwall surface.

NOTE

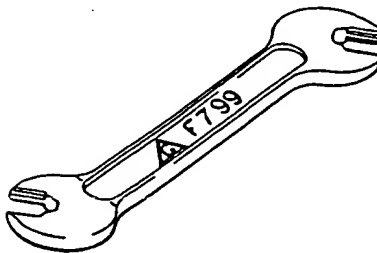
It is recommended that a spirit level be used to level the sprinkler fitting as shown in Figure G and that a square be used to check perpendicularity of the waterway centerline to the mounting surface.

3. Use only a non-hardening type of Teflon[®] based pipe joint sealant or Teflon[®] tape and apply it sparingly to the male threads only.
4. Hand tighten the sprinkler into the sprinkler fitting.

5. Use only the Model F799 Offset



**FIGURE G
LEVELING OF
SPRINKLER FITTING
AND DEFLECTOR**



**FIGURE H
OFFSET SPRINKLER WRENCH**

Sprinkler Wrench shown in Figure H to tighten the sprinkler into the fitting. The word "TOP" on the Deflector Hat must face upwards towards the ceiling.

It is recommended that a torque of 7 to 14 ft. lbs. (9,5 to 19,0 Nm) be used to obtain a leak tight 1/2 inch NPT sprinkler joint. A radial force of 10 to 20 lbs. (13,6 to 27,1 Nm) applied to the F799 wrench will exert a torque of 7 to 14 ft. lbs. (9,5 to 19,0 Nm).

NOTES

A maximum of 21 ft. lbs. (28,5 Nm) of torque is to be used to install the sprinkler. Higher levels of torque may distort the sprinkler orifice seat with consequent leakage.

It is recommended that a spirit level be used to level the Deflector Hat, as shown in Figure G. The Deflector Hat has a raised portion at the front. Consequently, the spirit level must be carefully positioned on the rear flat portion of the Deflector Hat.

Do not attempt to make-up for insufficient adjustment in an Escutcheon Plate by under- or over-tightening the Sprinkler. Readjust the position of the sprinkler fitting to suit.

CARE AND MAINTENANCE

The FR-1 Sprinklers must never be shipped, stored, or used where their temperature will exceed 100°F/38°C and they must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified or over-heated sprinklers must be replaced.

NOTE

Particular care to prevent overheating must be exercised when storing sprinklers in cars, trucks, trains, or other vehicles on warm, bright sunny days.

Care must be exercised to avoid damage to the FR-1 Sprinklers - both before and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

NOTES

Absence of an Escutcheon Plate, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

It is recommended that automatic sprinkler systems be inspected and maintained in accordance with the advice and suggestions given in NFPA 13A, NFPA 13D, and NFPA 13R, as applicable.

It is recommended that automatic sprinkler systems be inspected by a qualified Inspection Service.

In residential applications, the FR-1 Sprinklers must only be replaced with horizontal sidewall sprinklers which are listed for residential fire protection service and which have the same nominal K-factor, the same coverage area, the same or lower flow ratings (as indicated under "Hydraulic Design Criteria").

All residential sprinklers installed within a compartment (as defined by the NFPA) must have the same heat response thermal characteristic, and their temperature ratings are to be within 10°F of each other.

NOTES

Wet pipe sprinkler systems must be maintained at a minimum temperature of 40°F/4°C. Exposure to

freezing temperatures can result in bursting of the pipe and/or sprinkler.

Do NOT enclose sprinklers within drapes, curtains, or valances.

Do NOT hang anything from the sprinklers.

Automatic sprinklers are NOT to be tested with a heat source. Weakening or operation of the fusible Link Assembly can result.

Do NOT cleanse the sprinklers with soap and water, detergents, ammonia, cleaning fluids, or other chemicals. Remove dust, lint, cobwebs, cocoons, insects, and larvae by gently brushing with a feather duster or gently vacuuming with a soft bristle (i.e., dusting) brush attachment.

In residential applications, the minimum vertical clearance between the tops of free standing partitions, room dividers, cabinets, storage racks, stock piles, etc., and the centerline of the sprinkler waterway is NOT to be less than the clearance given below.

Horizontal Distance from Sprinkler to Item	Vertical Clearance
---	-------------------------------

More than 9' (2,7 m)	32" (810 mm)
From 6' to 9' (1,8 to 2,7 m)	26" (660 mm)
Less than 6' (1,8 m)	18" (460 mm)

Exercise suitable safety precautions in the use and storage of highly flammable and potentially explosive materials. The rapid rate of fire development and spread which can be caused by such materials can reduce the ability of the sprinkler system to aid in the control of a fire in which they are involved.

REMODELING

When remodeling such as by adding false beams or light fixtures or changing the location of compartment walls, first verify that the new construction will not violate the installation requirements stated under WARNINGS. After the new construction and/or the sprinkler system to suit the requirements of this document.

LIMITED WARRANTY

The manufacturer warrants for a period of one year from the date of sale (warranty period) that the product(s) sold hereunder are free from defects in material and workmanship. Our obligation under this warranty is limited to repair or replacement, or, at our option, we will repay the price paid for the product(s), plus any transportation charge paid by the purchaser. In the case of replacement, we will pay the transportation charges to the location of the defective product. We must be given the opportunity to inspect any product you believe to be defective. To make a claim under this limited warranty, you should contact our Sales Services Manager at (401) 886-3105.

THERE ARE NO OTHER WRITTEN OR ORAL WARRANTIES. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE DURATION OF THE LIMITED WARRANTY SET FORTH ABOVE.

The manufacturer does not assume any other obligation in connection with the sale of the product(s) by purchaser.

This warranty shall not apply to any product(s) which have been installed in violation of written instructions furnished by the manufacturer, repaired or altered, misused or damaged, or not properly maintained.

The manufacturer is not liable for indirect, incidental or consequential damages in connection with the use of the product(s).

Some states do not allow limitations on how long an implied warranty lasts, or exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

WARRANTY

The data provided in Figure D and E are not intended for use as a minimum wetting pattern specification.

Refer to Limited Warranty.

ORDERING PROCEDURE

Sprinkler Assemblies:

Specify: 1/2" orifice (15 mm) Model FR-1 RES/QR-EC Horizontal Sidewall Sprinkler with (specify type) finish, PSN (specify).

Natural brass finish PSN 58-970-1-165
Chrome finish PSN 58-970-9-165

Sprinkler Wrench:

Specify: Model F799 Sprinkler Wrench, PSN 56-452-1-001.

Order for NFPA publications should be addressed to the:

Publication Sales Department
NFPA
Batterymarch Park
Quincy, MA 02269

PATENTS

The following patents are applicable to the Model FR-1 Horizontal Sidewall Sprinklers:

COUNTRY	PATENT NO.
U.S.A.	4,296,815
U.S.A.	4,296,816
Canada	1,170,691
Canada	1,170,692
United Kingdom	2,103,480
United Kingdom	2,103,481

There are patents pending concerning the new link design of the Model FR-1 RES/QR-EC Horizontal Sidewall Sprinklers.

WEIGHT

The nominal weight of the 1/2 inch orifice, Model FR-1 RES/QR-EC Horizontal Sidewall Sprinkler is 0.17 pounds (77 g).



DRY HORIZONTAL SIDEWALL SPRINKLERS, EC **MODEL F960/Q-48 DESIGNER, 1/2" ORIFICE**

GENERAL DESCRIPTION

The 1/2 inch orifice Model F960/Q-48 Designer EC Dry Horizontal Sidewall Sprinklers (Ref. Figure A) are automatic sprinklers of the frangible bulb type. They are intended for use in light hazard, extended coverage (EC) automatic sprinkler system applications per NFPA 13.

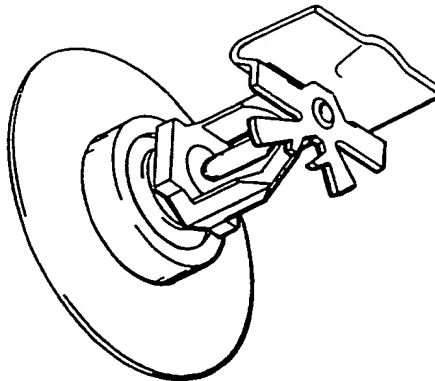
They are designed for installation along a wall and just beneath a smooth and level ceiling. Horizontal sidewall sprinklers are generally used in lieu of pendent sprinklers because of aesthetic, building construction, or installation economy considerations.

Available in 135°F and 155°F temperature ratings, as well as in order lengths of 1/2 inch increments from 2-1/2 to 48 inches, the F960/Q-48 is intended for use in applications where the sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures (e.g. horizontal piping extensions from a wet pipe system through a wall to protect a freezer or an unheated area of a building).

When the F960/Q-48 is in service, water is prevented from entering the assembly by the Plug and O-Ring Seal in the Inlet of the Sprinkler. Upon exposure to a temperature sufficient to operate the Bulb, the Bulb shatters and the Bulb Seat is released. The compressed Spring is then able to expand and push the Water Tube as well as the Guide Tube outward. This action simultaneously pulls outward on

the Yoke, withdrawing the Plug and O-Ring Seal from the Inlet and initiating water flow.

The Escutcheon Plate has been designed to provide 1 inch of total horizontal adjustment (plus or minus 1/2 inch), to assure proper field positioning and to reduce the accuracy to which the sprinkler fitting must be installed. The 3 inch outside diameter of the



TEMPERATURE RATINGS AND BULB LIQUID COLOR CODE:

135°F / 57°C Orange
 155°F / 68°C Red

NOMINAL K-FACTOR:

5.5 (GPM ÷ √psi)
 79.2 (LPM ÷ √bar)

"S" ORDER LENGTHS:

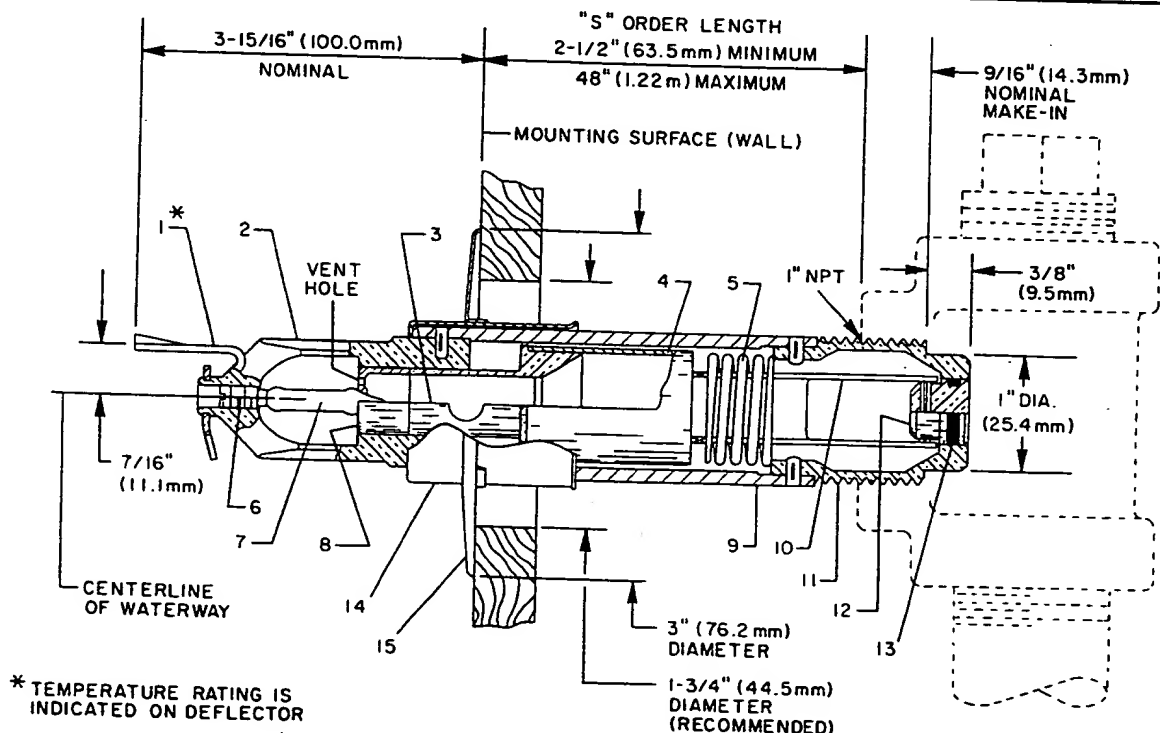
2-1/2 to 48 inches in 1/2 inch increments

FINISH COMBINATIONS:

Sprinkler	Escutcheon
Chrome Plated	Chrome Plated
Chrome Plated	White Painted
Natural Brass	White Painted

COMPONENTS:

- 1-Deflector
- 2-Frame
- 3-Guide Tube Sub-assembly
- 4-Water Tube
- 5-Spring
- 6-Compression Screw
- 7-Bulb
- 8-Bulb Seat
- 9-Casing
- 10-Yoke
- 11-Inlet
- 12-Plug
- 13-O-Ring Seal
- 14-Escutcheon, Inner Piece
- 15-Escutcheon, Outer Piece



* TEMPERATURE RATING IS INDICATED ON DEFLECTOR

FIGURE A
MODEL F960/Q-48 EC DRY HORIZONTAL SIDEWALL SPRINKLER
WITH STANDARD ESCUTCHEON PLATE

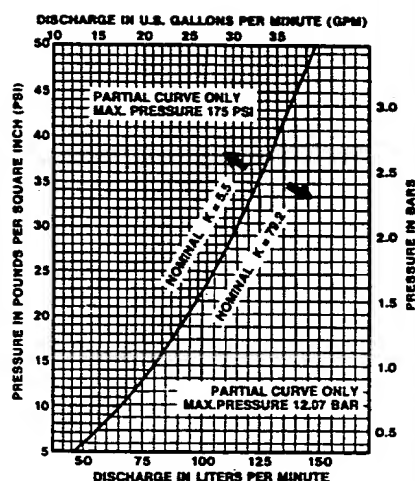


FIGURE B
NOMINAL DISCHARGE CURVE

outer piece of the Escutcheon Plate combined with the 1-3/4 inch diameter clearance hole size also contributes to the ease of installation by covering off-set clearance holes.

The Escutcheon Plate is a separable two-piece design which allows installation of the sprinklers and pressure testing of the fire protection system, prior to wall construction and/or application of a finish coat to the wall. It also permits refinishing of a wall surface without having to first shut down the fire protection system and remove the sprinklers.

APPROVALS AND STANDARDS

The 1/2 inch orifice Model F960/Q-48 EC Dry Horizontal Sidewall Sprinklers are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada.

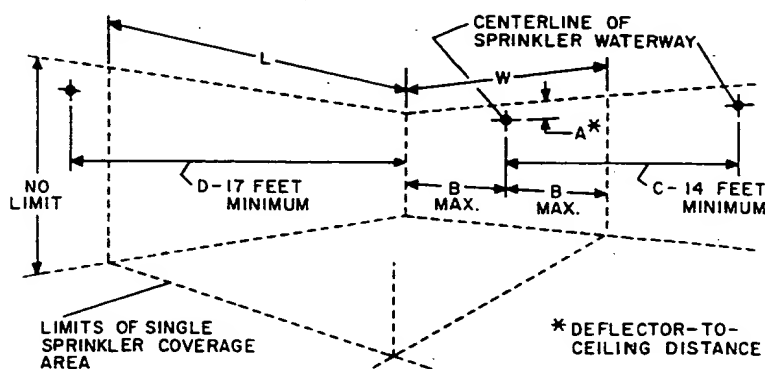
The laboratory listings only apply to the temperature ratings, order lengths, sprinkler finishes, and escutcheon plate finishes stated in Figure A, and only apply to the service conditions indicated in the Technical Data and EC Design Criteria sections.

WARNING

The Model F960/Q-48 EC Dry Horizontal Sidewall Sprinklers described herein must be installed and maintained in compliance with this document, as well as applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

The owner is responsible for main-

APPLICATION	W x L FT x FT	TEMP °F	MIN. FLOW ^(b) GPM	MIN. PRESSURE ^(b) PSI	A INCHES	B FEET
EC ^(a)	16 x 16	135 & 155	26	22.3	4 to 12 ^(c)	8
EC ^(a)	16 x 18	135 & 155	29	27.8	4 to 12 ^(c)	8
EC ^(a)	16 x 20	135 & 155	32	33.9	4 to 12 ^(c)	8
EC ^(a)	18 x 16	135 & 155	29	27.8	4 to 12 ^(c)	9



NOTES:

- Light Hazard Occupancy automatic sprinkler system applications per NFPA 13.
- Requirement is based on minimum flow in GPM from each sprinkler. The indicated residual pressures are based on the nominal K-factor.
- To meet this requirement, the centerline of the waterway (Ref. Fig. A) must be installed between 4-7/16 and 12-7/16 inches below the ceiling.

TABLE A
INSTALLATION CRITERIA FOR 1/2 INCH ORIFICE
MODEL F960/Q-48 EC DRY HORIZONTAL SIDEWALL SPRINKLERS

taining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.

The Model F960/Q-48 EC Dry Horizontal Sidewall Sprinklers cannot be installed in threaded elbow fittings or plain end pipe fittings without first having the fitting manufacturer verify that there will be clearance between the F960/Q-48 Inlet and the inside of the pipe fitting. Failure to use a pipe fitting with clearance for the F960/Q-48 Inlet may result in a binding of the Plug and a failure of the sprinkler to operate or, insufficient engagement of the 1 inch NPT pipe threads with consequent leakage.

TECHNICAL DATA

The 1/2 inch orifice Model F960/Q-48 EC Dry Horizontal Sidewall Sprinklers are rated for use at a maximum service pressure of 175 psi. The available temperature ratings, order lengths, sprinkler finishes, and escutcheon plate finishes are given in Figure A.

The F960/Q-48 must be installed with a deflector to ceiling distance of 4 to 12

inches. To meet this requirement, the centerline of the sprinkler waterway (Ref. Fig. A) must be between 4-7/16 and 12-7/16 inches below the ceiling.

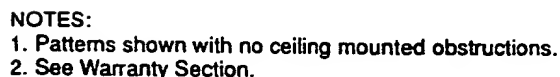
The nominal discharge curve for the F960/Q-48 is plotted in Figure B and it represents the flow "Q" in U.S. gallons per minute (gpm) as determined by the formula:

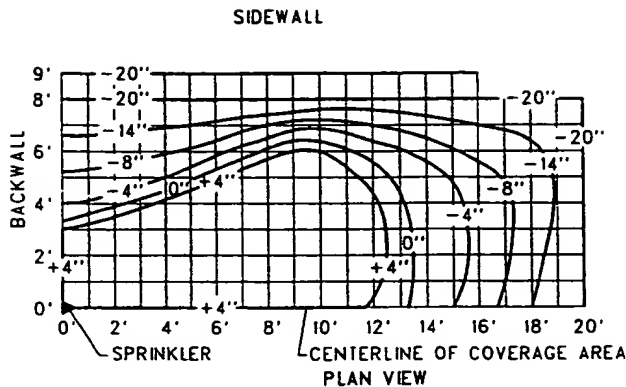
$$Q = K\sqrt{p}$$

where the nominal sprinkler discharge coefficient "K" = 5.5 and "p" = pressure in pounds per square inch (psi). Listing standards permit the actual value of "K" to vary from 5.3 to 5.8.

The F960/Q-48 EC Dry Horizontal Sidewall Sprinklers are to be installed in fittings that provide clearance between the F960/Q-48 Inlet and the inside of the fitting. The F960/Q-48 Sprinklers may be installed in 1 inch NPT outlet connections of malleable iron threaded tee fittings per ANSI B16.3 or cast iron threaded tee fittings per ANSI B16.4. For threaded tee fittings, the end sprinkler fitting on a branch line is to be a plugged tee fitting (Ref. Figure A).

Gruvlok® Sock-It™ x 1 inch NPT side outlet fittings manufactured by Grinnell





NOTES:

1. For a given position within the coverage area, ceiling mounted obstructions must not hang below the elevation dimension given in the graph.
2. Elevation dimensions are with respect to the top of the Deflector Hat (ref. Fig.A), where positive (+) dimensions are above the Deflector Hat and negative (-) dimensions are below. (Reference: The Deflector Hat is 7/16" above the centerline of the sprinkler waterway.)

FIGURE D
ALLOWABLE ELEVATION FOR CEILING MOUNTED OBSTRUCTIONS
SUCH AS HEATING OR AIR CONDITIONING DIFFUSERS, OVERHANGS,
AND LIGHT FIXTURES

minimum requirements of the National Fire Protection Association for dry pipe sprinkler systems.

The outer piece of the Escutcheon Plate cannot be used to hold the F960/Q-48 Sprinkler in position. Pipe support must be provided in accordance with the minimum requirements of the National Fire Protection Association with respect to armovers and wall mounted sidewall sprinklers.

When dry horizontal sidewall sprinklers are to be used on wet pipe sprinkler systems protecting areas subject to freezing temperatures (e.g., coolers or freezers), consideration must be given to the appropriate length of the sprinkler that will prevent freezing of the water in the connecting pipes, due to conduction. The following are the minimum recommended lengths between the face of the F960/Q-48 sprinkler fitting and the outside surface of the protected area, when the temperature surrounding the wet pipe sprinkler system is maintained at a minimum temperature of 40°F:

- 6 inches when the temperature within the protected area is 0°F;
- 12 inches when the temperature within the protected area is -20°F;
- 18 inches when the temperature within the protected area is -40°F; and,
- 24 inches when the temperature within the protected area is -60°F.

For protected area temperatures be-

tween those given above, the minimum recommended length from the face of the fitting to the outside of the protected area may be determined by interpolating between the individual values.

INSTALLATION

NOTES

The Model F960/Q-48 EC Dry Horizontal Sidewall Sprinkler must only be installed in fittings that meet the requirements of the Warning and Technical Data sections.

Refer to the System Design section for other important requirements regarding piping design.

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontal, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch for the 135°F/57°C and 155°F/68°C temperature ratings.

The sprinkler fitting should be located so that the face-of-fitting to mounting surface distance is within plus or minus 1/4 inch of the sprinkler order length. The remaining escutcheon plate adjustment can then be used to compensate for the possible manufacturing variations in the take-out of the fittings, as well as in the make-in of the

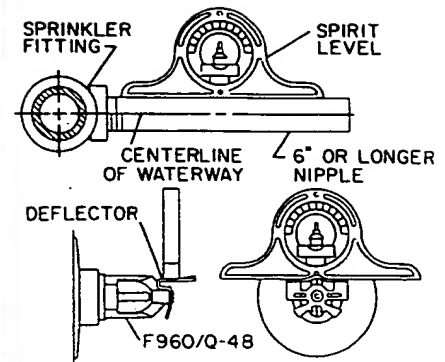


FIGURE E
LEVELING OF
SPRINKLER FITTING
AND DEFLECTOR

sprinklers (as permitted by ANSI B1.20.1).

The F960/Q-48 must be installed with a deflector to ceiling distance of 4 to 12 inches. To meet this requirement, the centerline of the sprinkler waterway (Ref. Fig. A) must be between 4-7/16 and 12-7/16 inches below the ceiling.

The Model F960/Q-48 must be installed with the centerline of the waterway horizontal and perpendicular to the back wall surface. The word "TOP" on the deflector must face upwards toward the ceiling.

It is recommended that a lightweight spirit level (less than 1 pound), be used to level the sprinkler fitting and the sprinkler Deflector, as shown in Figure E.

NOTE

The Deflector has a raised portion at the front; consequently, the spirit level must be positioned on the rear flat portion of the Deflector.

Proceed with the installation as follows:

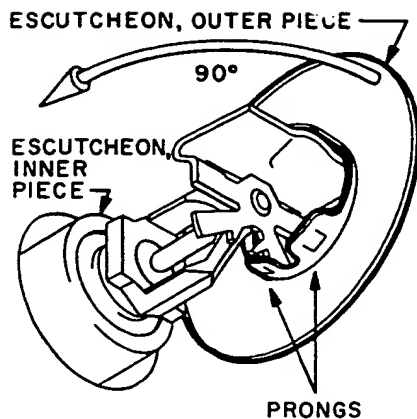
1. Apply pipe thread sealant sparingly to the 1 inch NPT sprinkler threads only. Use of a Teflon[†] based pipe joint sealant is recommended.
2. Install the F960/Q-48 by wrenching on the Casing with a pipe wrench, whenever the Casing is readily accessible. Otherwise, use a 10 inch adjustable wrench applied to the wrench flats of the Frame.

NOTES

A leak tight 1 inch NPT sprinkler joint should be obtained with a torque of 20 to 30 ft.lbs. Higher levels of torque may distort the Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to make-up for in-

[†] DuPont Registered Trademark



**FIGURE F
ESCUTCHEON OUTER PIECE
INSTALLATION PROCEDURE**

sufficient adjustment in an escutcheon plate by under- or over-tightening the sprinkler. Readjust the position of the sprinkler fitting to suit.

3. After the wall has been installed or the finish coat has been applied, install the outer piece of the Escutcheon as follows:
 - a. Refer to Figure F and place the outer piece of the Escutcheon over one side of the Deflector with one pair of the Prongs at the bottom as shown in Figure F, and with the other pair of Prongs directly above the Deflector.
 - b. Pass the outer piece of the Escutcheon over the Deflector by horizontally swinging the outer piece 90° towards the wall.
 - c. Slide the outer piece of the Escutcheon over the inner piece until the outer piece comes in contact with the wall.

CARE AND MAINTENANCE

Automatic sprinklers must never be shipped or stored where their temperatures will exceed 100°F/38°C and they must never be painted, plated, coated or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers — both before and after installation. Sprinklers dam-

aged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (ref. Installation Section.)

If a sprinkler must be removed for some reason, do not reinstall it or a replacement without reinstalling the outer piece of the Escutcheon Plate. If the outer piece of an escutcheon plate becomes dislodged during service, replace it immediately.

NOTES

Absence of the outer piece of an escutcheon plate may delay the time to sprinkler operation in a fire situation.

Before closing a fire protection system control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

It is recommended that automatic sprinkler systems be inspected quarterly by a qualified Inspection Service.

NOTES

It is recommended that the piping connected to dry horizontal sidewall sprinklers be periodically checked to assure that proper pitch and drainage is in accordance with the minimum requirements of the National Fire Protection Association, if the piping is subject to freezing temperatures.

A Vent Hole is provided in the Bulb Seat (Ref. Figure A) to indicate that the Dry Horizontal Sidewall Sprinkler is remaining dry. Evidence of leakage from this Vent Hole is an indication that there may be weepage past the O-Ring Seal and, therefore, it is an indication that the sprinkler must be removed for determining the cause of leakage (e.g. an improper installation or an ice plug). The fire protection system control valve must be closed and the system drained before removing the sprinkler.

WARRANTY

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

PSN 60 — XXX — X — XXX

						"S" ORDER LENGTH INCHES DECIMAL (FOR EXAMPLE)	
						025	2.5"
						080	8.0"
						180	18.0"
						185	18.5"
						475	47.5"
						480	48.0"

TEMPERATURE RATING	
950	135°F / 57°C
951	155°F / 68°C

	SPRINKLER FINISH	ESCUTCHEON PLATE FINISH
0	CHROME PLATED	WHITE PAINTED
1	NATURAL BRASS	WHITE PAINTED
9	CHROME PLATED	CHROME PLATED

TABLE B
PRODUCT SYMBOL NUMBER SELECTION
FOR MODEL F960/Q-48 EC DRY HORIZONTAL SIDEWALL SPRINKLERS WITH STANDARD ESCUTCHEON PLATES

ORDERING PROCEDURE

Model F960/Q-48 EC Dry Horizontal Sidewall Sprinklers are furnished based upon "Ordered Lengths" as measured from the face of the wall to the face of the fitting in which the individual sprinkler is to be installed (refer to Figure A). After the measured length is taken, round the measurement up or down to the nearest 1/2 inch increment from 2-1/2 to 48 inches. Orders must include the description and Product Symbol Numbers.

Sprinklers:

Specify: (temperature rating) Model F960/Q-48 EC Dry Horizontal Sidewall Sprinkler with (specify type) finish Sprinkler and (specify type) finish Standard Escutcheon Plate and "S" Order Length of (specify) inches; PSN (specify from Table B).

Contact your local distributor for availability.

Replacement Parts:

To order a replacement for the outer piece of the Escutcheon Plate, specify description and for use with Model F960/Q-48 EC Dry Horizontal Sidewall Sprinkler, and Product Symbol Number (PSN). A replacement inner piece for the Escutcheon Plate is not available.

Chrome Plated

Outer Piece for

F960/Q-48

Standard

Escutcheon

Plate PSN 56-960-9-007

Painted White

Outer Piece for

F960/Q-48

Standard

Escutcheon

Plate PSN 56-960-0-007

PATENTS

There is a patent pending concerning certain features of the Model F960/Q-48 EC Dry Horizontal Sidewall Sprinklers.

CONVERSION FACTORS

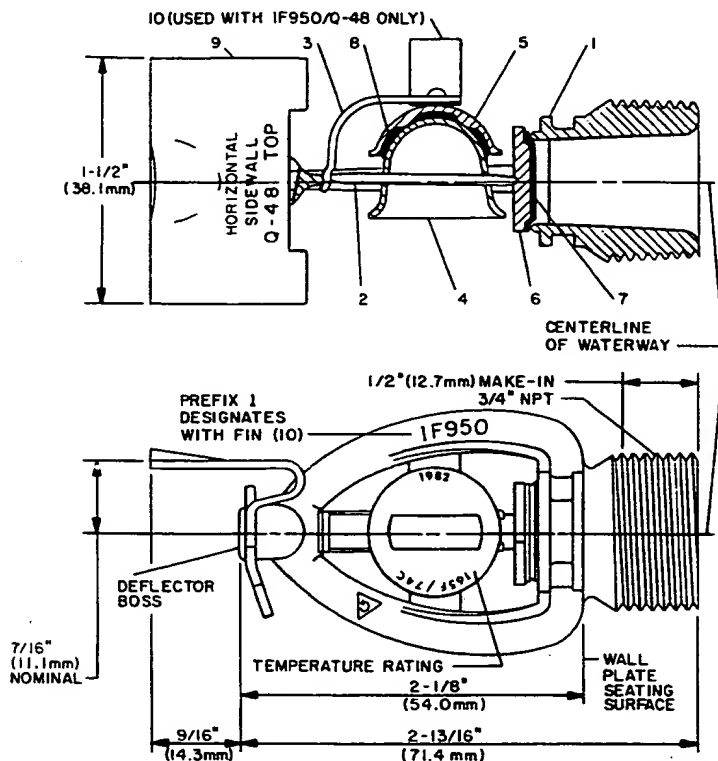
Parenthetical metric conversion factors cited herein are approximate.

1 inch = 25.400 mm
 1 ft.lb. = 1.356 Nm



EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

MODELS F950/Q-48 AND 1F950/Q-48, SOLDER TYPE, 17/32" ORIFICE



Components:

- 1—Frame
- 2—Strut
- 3—Hook
- 4—Heat Collector
- 5—Key
- 6—Button
- 7—Gasket
- 8—Solder
- 9—Deflector, E.C. Horizontal Sidewall, Q-48
- 10—Fin

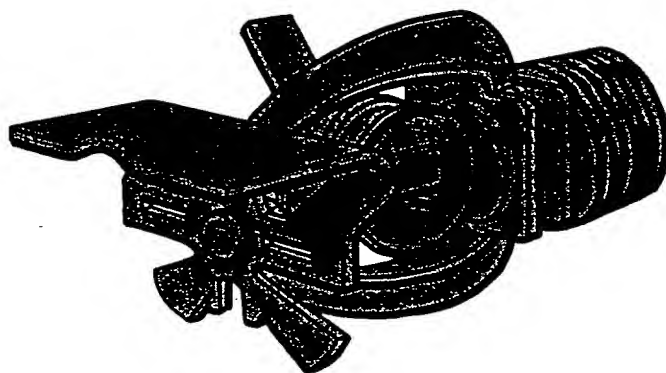


FIGURE A
17/32 INCH ORIFICE MODEL F950/Q-48 AND 1F950/Q-48
EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLER ASSEMBLIES

GENERAL DESCRIPTION

The 17/32 inch orifice Model F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers (Ref. Figure A) are automatic sprinklers of the fusible solder type. They are designed for installation along a wall or the side of a beam and just beneath a smooth and level ceiling. Horizontal sidewall sprinklers are generally used in lieu of pendent or upright sprinklers because of aesthetic, building construction or installation economy considerations.

The Model 1F950/Q-48 sprinkler has a Fin added to the fusible link, in order to provide the thermal response characteristic necessary for use with coverage areas of up to 16 feet wide by 20 feet long.

APPROVALS AND STANDARDS

The 17/32 inch orifice Model F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers

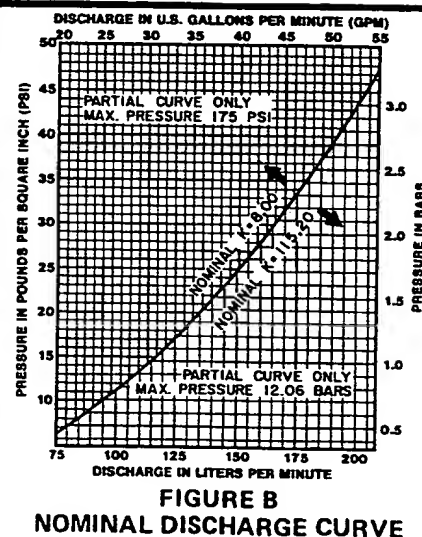
are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada for use in Light Hazard Occupancies.

The listings only apply to the temperature rating, finishes, minimum flow and installation criteria stated in the Technical Data Section.

WARNING

The F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of this device.

The owner is responsible for maintaining his fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.



TECHNICAL DATA

The 17/32 inch orifice Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers are available in a 165F/74C temperature rating with either natural brass or chrome plated finishes. The sprinklers are rated for use at a maximum service pressure of 175 psi.

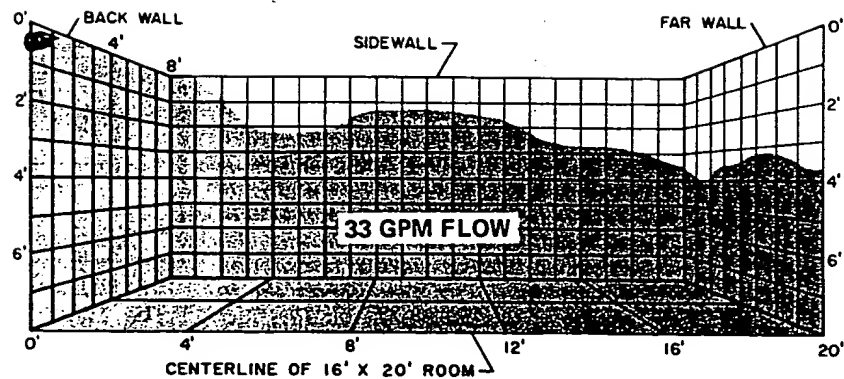
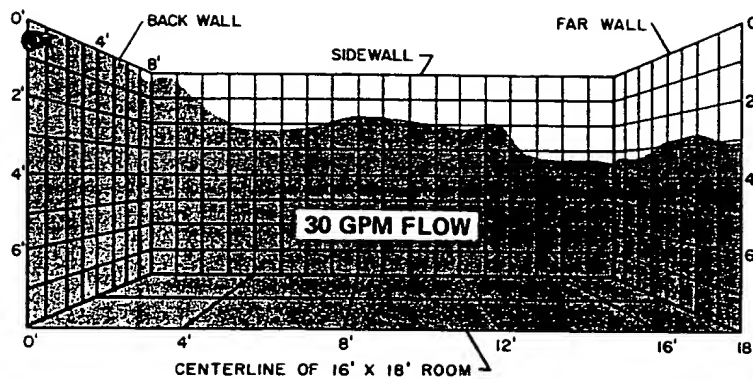
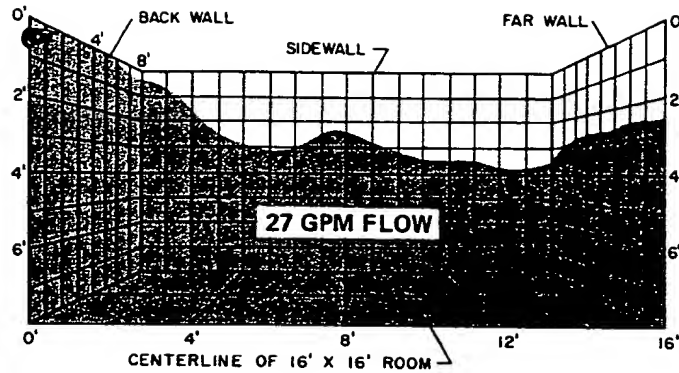
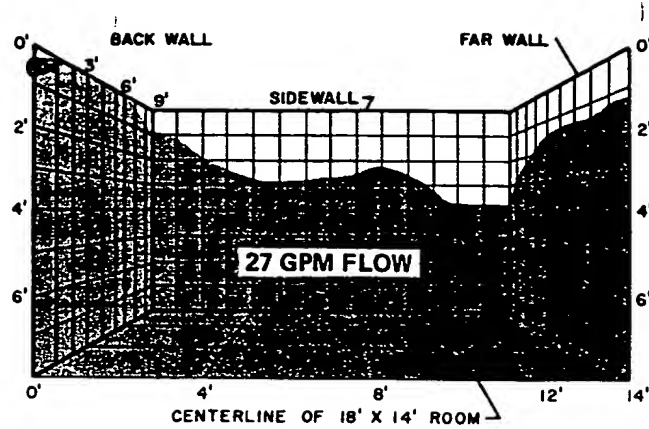
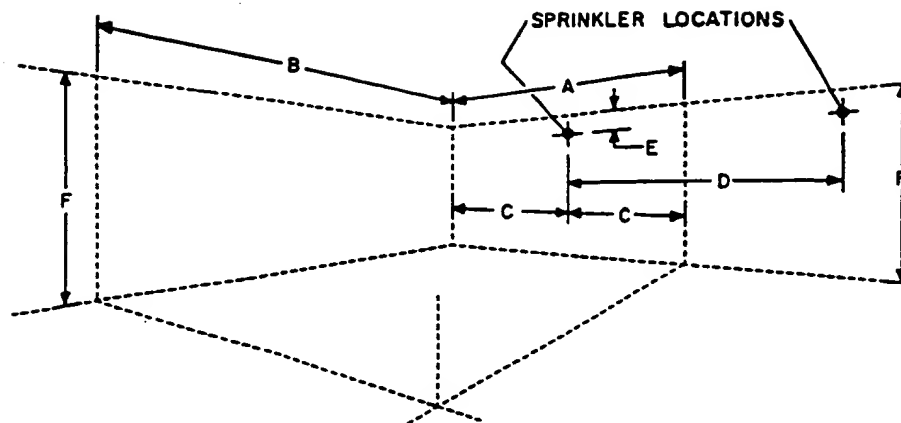


FIGURE C
NOMINAL WETTING PATTERNS AT MINIMUM REQUIRED FLOW CONDITIONS
AND DEFLECTOR TO CEILING DISTANCE OF 4 INCHES*



A	Maximum width of sprinkler coverage	16 feet	16 feet	16 feet	18 feet	20 feet
B	Maximum length of sprinkler coverage	16 feet	18 feet	20 feet ^(a.)	14 feet	14 feet
	Minimum required flow, (residual pressure) ^(b.)	27 GPM (11.4 psi)	30 GPM (14.1 psi)	33 GPM (17.0 psi)	27 GPM (11.4 psi)	30 GPM (14.1 psi)
C	Maximum distance between sprinkler and adjacent wall or between sprinkler and adjacent sprinkler coverage area	8 feet			9 feet	10 feet
D	Minimum distance between adjacent sprinklers	14 feet				
E	Deflector to ceiling distance ^(c.)	4 to 6 inches				
F	Maximum ceiling height with one sprinkler per room or compartmented area ^(d.)	No Limit				
	Maximum ceiling height with two or more sprinklers in the same room or compartmented area ^(d.)	9 feet				

(a.) The 1 F950/Q-48 must be used for maximum sprinkler coverage lengths of more than 18 feet. The F950/Q-48 may be used with maximum sprinkler coverage lengths of up to 18 feet.

(b.) Requirement is based on minimum flow in GPM. The indicated residual pressures are based on the nominal K-factor.

(c.) To meet this requirement, the centerline of the sprinkler waterway (Ref. Fig. A) must be installed between 4-7/16 and 6-7/16 inches below the ceiling.

(d.) Requirement applies when there are two or more extended coverage sprinklers of any type within the same room or compartmented area[●].

● A compartmented area is a space bound on all sides with walls or with beams or lintels extending at least two inches below the centerline of the waterway of the lowest installed sprinkler.

TABLE A
INSTALLATION CRITERIA FOR 17/32 INCH ORIFICE MODEL F950/Q-48 AND 1F950/Q-48
EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

The nominal discharge curve plotted in Figure B represents the flow "Q" in U.S. gallons per minute (gpm) as determined by the formula: $Q = K\sqrt{p}$ where the nominal sprinkler discharge coefficient is "K" and "p" = pressure

in pounds per square inch (psi). Listing standards permit the actual value of "K" to vary from 7.4 to 8.2.

Material specifications for Components 1 thru 8 are the same as for the

1/2 inch orifice F950 Upright and Pendant Sprinklers described in TD517. The Deflector is brass per ASTM B36 (C22000) and the Fin which is utilized with the 1F950/Q48 is copper per ASTM B152 (C11000).

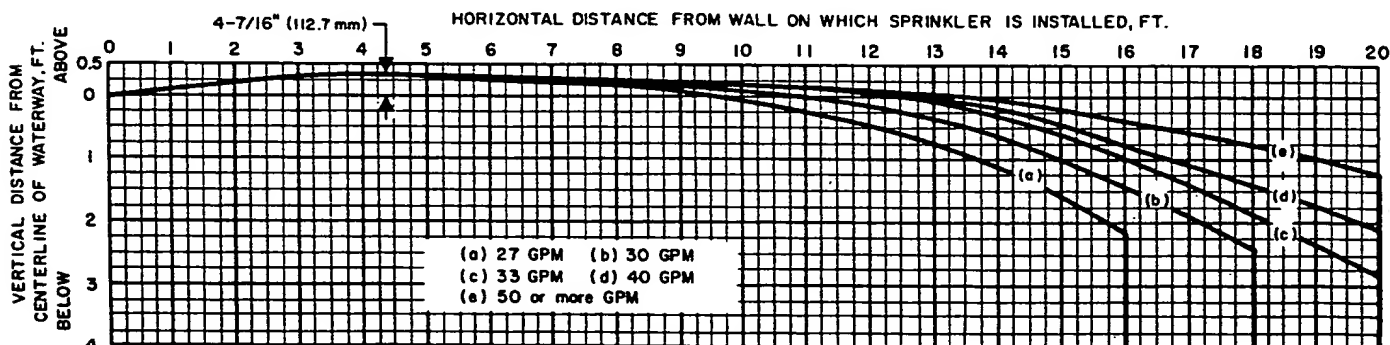


FIGURE D, UPPER LIMIT OF WATER SPRAY*



E. C. HOR. SIDEWALL SPRINKLER, F950/Q-48 & 1F950/Q-48, 17/32" ORIFICE

The ULI and ULC Listings for the 17/32 inch orifice Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers only apply to their use in Light Hazard Occupancies, under smooth and level ceilings, and in accordance with the installation criteria given in Table A. The F950/Q-48 may be used for maximum sprinkler coverage lengths of 18 feet. The 1F950/Q-48 must be used for maximum sprinkler coverage lengths of more than 18 feet.

NOTE

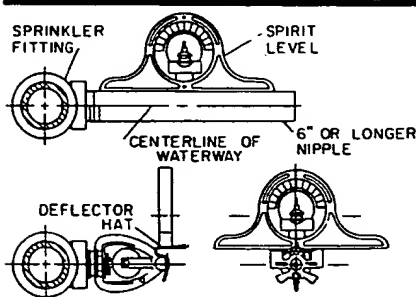
For coverage area dimensions less than or between those indicated in Table A, it is necessary to use the minimum required flow for the next highest width (A) and length (B) for which installation criteria are stated.

The nominal wetting patterns are illustrated in Figure C for the minimum flows required with each coverage area.

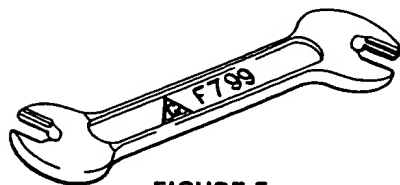
Figure D illustrates the upper limit of the water spray as a function of flow. The sprinkler must be spaced away from beams and other ceiling obstructions such that they will not interfere with the proper distribution of water by the sprinkler.

NOTE

Ceiling obstructions must be spaced above the "Upper Limit of Water Spray" which is associated with the maximum flow (residual pressure) for single sprinkler operation.



**FIGURE E
LEVELING OF
SPRINKLER FITTING
AND DEFLECTOR HAT**



**FIGURE F
OFFSET SPRINKLER WRENCH**

Soffits used for the installation of Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers are to be a maximum of 6 inches wide (distance from wall).

NOTE

Soffits wider than 6 inches are permitted if additional sprinkler protection is provided for the area below the soffit.

INSTALLATION

The 17/32 inch orifice Model F950/Q-48 and 1F950/Q-48 Extended Coverage Horizontal Sidewall Sprinklers must be installed with the centerline of the waterway horizontal and perpendicular to the back wall surface. The word "TOP" on the Deflector must face upwards toward the ceiling.

It is recommended that a light weight spirit level (less than 1 pound), be used to level the sprinkler fitting and the sprinkler Deflector Hat, as shown in Figure E, and that a square be used to check perpendicularity of the waterway centerline to the back wall.

NOTE

The Deflector Hat has a raised portion at the front. Consequently, the spirit level must be carefully positioned on the rear-flat portion of the Deflector Hat.

Only use the Model F799 Offset Sprinkler Wrench shown in Figure F for installation of the sprinkler.

CARE AND MAINTENANCE

Automatic sprinklers must never be shipped or stored where their temperatures will exceed 100F/38C and they must never be painted, plated, coated or otherwise altered after leaving the factory. Modified or over-heated sprinklers must be replaced.

Care must be exercised to avoid damage to the sprinklers — both before and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

NOTE

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may

be affected by this action must be notified.

It is recommended that automatic sprinkler systems be inspected quarterly by a qualified Inspection Service.

WARRANTY

The data provided in Figure C is not intended for use as a minimum wetting pattern specification and the data given in Figure D is not intended for use as a minimum water spray profile specification.

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

Sprinkler Assemblies:

Specify: 17/32 inch orifice, 165F, Model (specify F950/Q-48 or 1F950/Q-48) E. C. Horizontal Sidewall Sprinkler with (specify type of finish), PSN (specify).

Model F950/Q-48

Natural Brass Finish...PSN 50-958-1-165
Chrome Plated Finish...PSN 50-958-9-165

Model 1F950/Q-48

Natural Brass Finish...PSN 50-960-1-165
Chrome Plated Finish...PSN 50-960-9-165

Separately Ordered Parts:

Specify: Model F799 Offset Sprinkler Wrench, PSN 56-452-1-001.

PATENTS

The following patents are applicable to the Model F950/Q-48 and 1F950/Q-48 E. C. Horizontal Sidewall Sprinklers:

COUNTRY	PATENT NO.
U.S.A.	4,296,815
U.S.A.	4,296,816
United Kingdom	2,103,480
United Kingdom	2,103,481

CONVERSION FACTORS

Parenthetical metric conversions cited herein are approximate.

1 inch	= 25.400 mm
1 foot	= 0.3048 m
1 psi	= 6.895 kPa
	= 0.0689 bar*
	= 0.0703 kg/cm ² *
1 lb.	= 0.4536 kg
1 U.S. gallon	= 3.785 dm ³
	= 3.785 litres*

*Not recognized International System units.



HOR. SIDEWALL & RECESSED HOR. SIDEWALL SPRINKLERS

UNIVERSAL MODEL A

QR-EC and EC, 3 & 5 mm BULB TYPE, 17/32" (20 mm) ORIFICE, 3/4" NPT**

GENERAL DESCRIPTION

The 17/32 inch (20 mm) orifice Universal Model A Extended Coverage Horizontal Sidewall Sprinklers and Recessed Extended Coverage Horizontal Sidewall Sprinklers (Ref. Figure A) are automatic sprinklers of the frangible bulb type. They are available in the following temperature ratings and model designations:

135°F/57°C Model A QR-EC
 135°F/57°C Model A EC
 155°F/68°C Model A QR-EC/EC
 155°F/68°C Model A EC
 175°F/79°C Model A QR-EC/EC

All QR-EC and QR-EC/EC models utilize a 3 mm diameter bulb, and all EC models utilize a 5 mm diameter bulb.

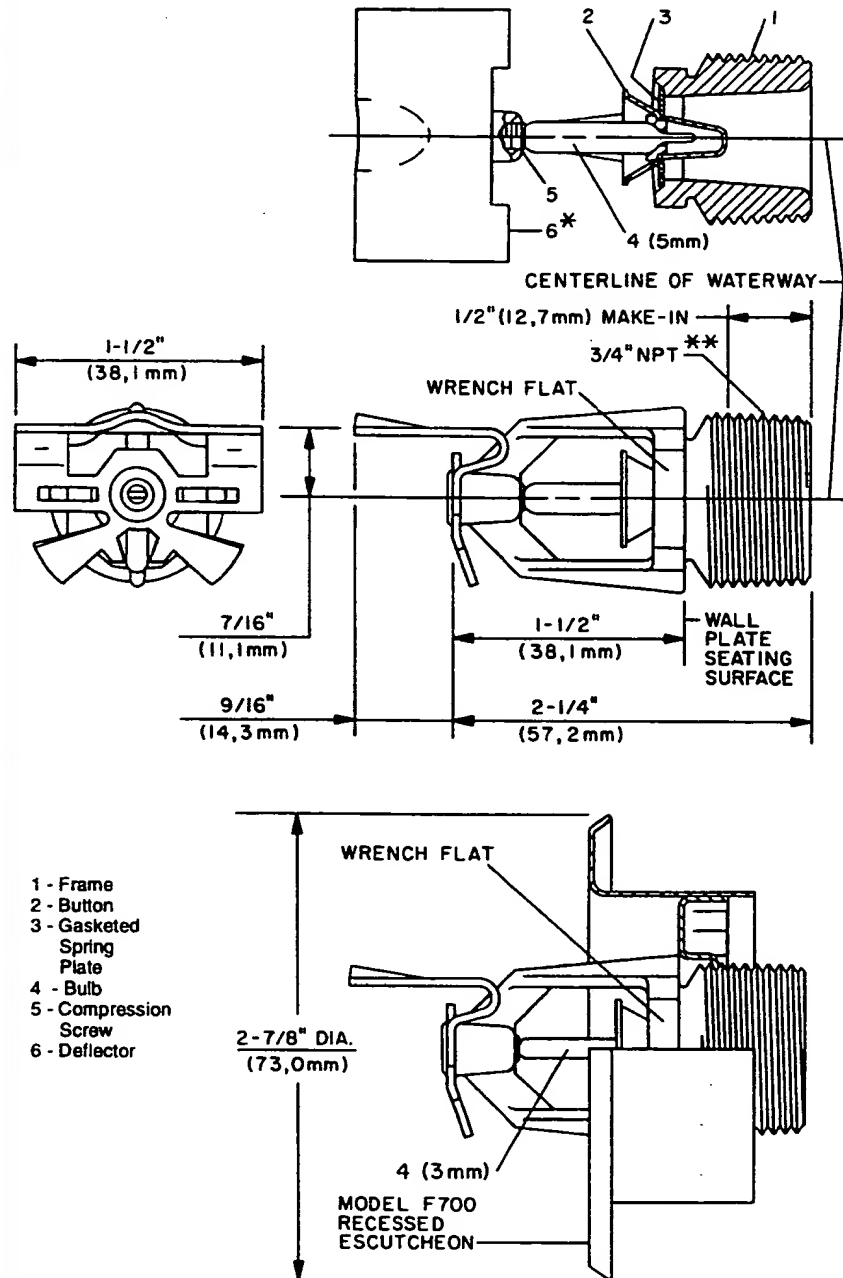
The model designation suffix (i.e., QR-EC or EC) indicates the intended application, as given in Table A-1 or A-2, for use in

- light hazard, quick response - extended coverage (QR-EC) sprinkler system applications per NFPA 13 or FM installation standards, or
- light hazard, extended coverage (EC) sprinkler system applications per NFPA 13 or FM installation standards.

They are designed for installation along a wall and just beneath a smooth and level ceiling as defined in the applicable installation standard. Horizontal sidewall sprinklers are generally used in lieu of pendent sprinklers because of aesthetic, building construction, or installation economy considerations.

The recessed versions of the Model A Extended Coverage Horizontal Sidewall Sprinklers are obtained by utilizing the Model F700 Recessed Escutcheon (Ref. Figure B). The F700 Recessed Escutcheon provides 1/2 inch (12,7 mm) of recessed adjustment or up to 3/4 inch (19,1 mm) of adjustment from the flush sidewall position.

The F700 has a separable two-piece design which allows installation of the sprinklers and pressure testing of the

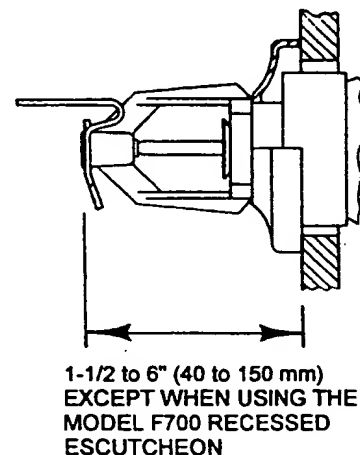
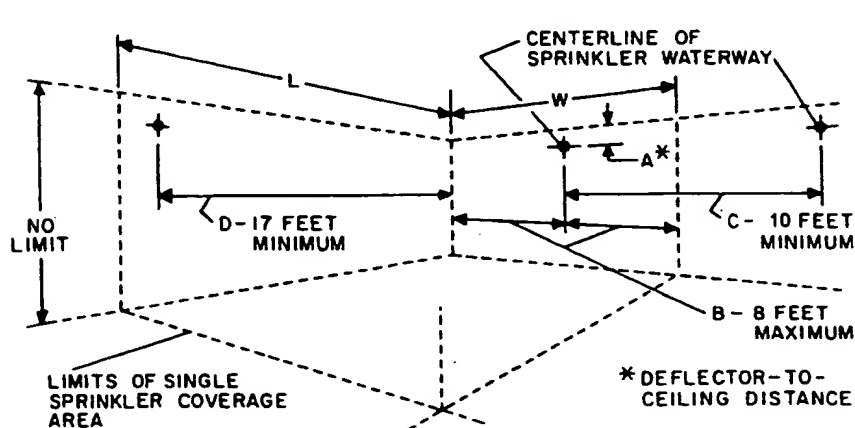


* Temperature rating is indicated on deflector or adjacent to orifice seat on frame.

** Pipe thread connections per ISO 7/1 can be provided on special request.

FIGURE A
17/32 INCH ORIFICE MODEL A EXTENDED COVERAGE
HORIZONTAL SIDEWALL SPRINKLERS AND
RECESSED HORIZONTAL SIDEWALL SPRINKLERS

APPLICATION	COVERAGE AREA W x L FT. x FT. (m x m)	MINIMUM FLOW ^(c) GPM (LPM)	MINIMUM PRES. ^(c) PSI (BAR)	DEFLECTOR-TO- CEILING A ^(d) INCHES (mm)	SPRINKLER TEMP. RATING °F	MODEL	BULB SIZE (Ref.)
QR-EC ^(a)	16 x 16 (4,9 x 4,9)	26 (98)	10.3 (0,71)	4 to 12 (100 to 300)	135	A QR-EC	3 mm
	16 x 16 (4,9 x 4,9)	26 (98)	10.3 (0,71)	4 to 12 (100 to 300)	155, 175	A QR-EC/EC	
	16 x 18 (4,9 x 5,5)	29 (110)	12.8 (0,88)	4 to 12 (100 to 300)	135	A QR-EC	
	16 x 18 (4,9 x 5,5)	29 (110)	12.8 (0,88)	4 to 12 (100 to 300)	155, 175	A QR-EC/EC	
	16 x 20 (4,9 x 6,1)	32 (121)	15.6 (1,08)	4 to 10 (100 to 250)	135	A QR-EC	
	16 x 20 (4,9 x 6,1)	33 (125)	16.6 (1,14)	4 to 12 (100 to 300)			
	16 x 22 (4,9 x 6,7)	35 (133)	18.7 (1,29)	4 to 8 (100 to 200)			
	16 x 22 (4,9 x 6,7)	36 (136)	19.8 (1,37)	4 to 12 (100 to 300)			
	16 x 24 (4,9 x 7,3)	39 (148)	23.2 (1,60)	4 to 8 (100 to 200)			
	16 x 24 (4,9 x 7,3)	40 (151)	24.4 (1,68)	4 to 12 (100 to 300)			
EC ^(b)	16 x 16 (4,9 x 4,9)	26 (98)	10.3 (0,71)	4 to 12 (100 to 300)	135, 155	A EC	5 mm
	16 x 18 (4,9 x 5,5)	29 (110)	12.8 (0,88)	4 to 12 (100 to 300)			
	16 x 20 (4,9 x 6,1)	32 (121)	15.6 (1,08)	4 to 10 (100 to 250)	135	A QR-EC/EC	3 mm
	16 x 20 (4,9 x 6,1)	33 (125)	16.6 (1,14)	4 to 12 (100 to 300)			
	16 x 20 (4,9 x 6,1)	32 (121)	15.6 (1,08)	4 to 10 (100 to 250)	155	A QR-EC/EC	3 mm
	16 x 20 (4,9 x 6,1)	33 (125)	16.6 (1,14)	4 to 12 (100 to 300)			
	16 x 22 (4,9 x 6,7)	35 (133)	18.7 (1,29)	4 to 8 (100 to 200)	135	A EC	5 mm
	16 x 22 (4,9 x 6,7)	36 (136)	19.8 (1,37)	4 to 12 (100 to 300)			
	16 x 22 (4,9 x 6,7)	35 (133)	18.7 (1,29)	4 to 8 (100 to 200)	155, 175	A QR-EC/EC	3 mm
	16 x 22 (4,9 x 6,7)	36 (136)	19.8 (1,37)	4 to 12 (100 to 300)			
	16 x 24 (4,9 x 7,3)	39 (148)	23.2 (1,60)	4 to 8 (100 to 200)	135	A EC	5 mm
	16 x 24 (4,9 x 7,3)	40 (151)	24.4 (1,68)	4 to 12 (100 to 300)			
	16 x 24 (4,9 x 7,3)	39 (148)	23.2 (1,60)	4 to 8 (100 to 200)	155, 175	A QR-EC/EC	3 mm
	16 x 24 (4,9 x 7,3)	40 (151)	24.4 (1,68)	4 to 12 (100 to 300)			

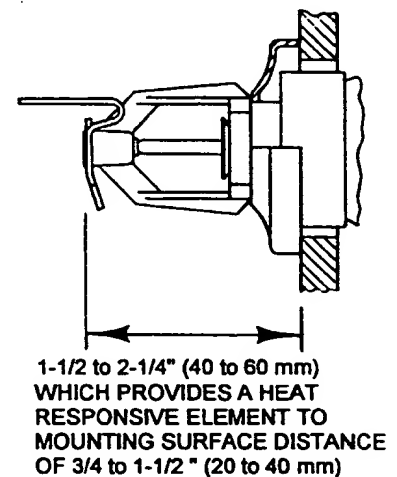
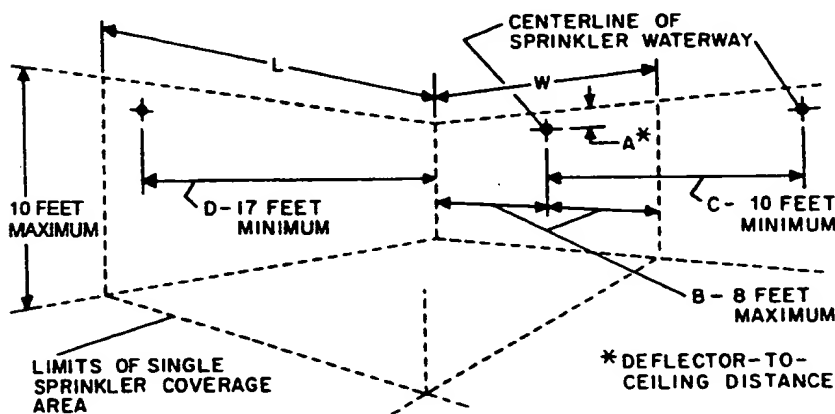


NOTES:

- For use in QR-EC and EC Light Hazard Occupancy automatic sprinkler system applications per NFPA 13.
- For use in EC Light Hazard Occupancy automatic sprinkler system applications per NFPA 13.
- Requirement is based on minimum flow in GPM from each sprinkler. The indicated residual pressures are based on the nominal K-factor.
- The centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Ref. Figure A).
- For use under smooth level ceilings per NFPA 13.

TABLE A-1
UL AND ULC LISTING CRITERIA FOR INSTALLATION OF
17/32 INCH ORIFICE MODEL A EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS
AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS

APPLICATION	COVERAGE AREA W x L FT. x FT. (m x m)	MINIMUM FLOW ^(c) GPM (LPM)	MINIMUM PRES. ^(e) PSI (BAR)	DEFLECTOR-TO- CEILING A ^(d) INCHES (mm)	SPRINKLER TEMP. RATING °F	MODEL	BULB SIZE (Ref.)
QR-EC ^(a)	16 x 16 (4,9 x 4,9)	32 (121)	16 (1,10)	4 to 12 (100 to 300)	135	A QR-EC	3 mm
	16 x 16 (4,9 x 4,9)	32 (121)	16 (1,10)	4 to 12 (100 to 300)	155	A QR-EC/EC	
	16 x 18 (4,9 x 5,5)	36 (136)	20 (1,38)	4 to 12 (100 to 300)	135	A QR-EC	
	16 x 18 (4,9 x 5,5)	36 (136)	20 (1,38)	4 to 12 (100 to 300)	155	A QR-EC/EC	
	16 x 20 (4,9 x 6,1)	40 (151)	25 (1,72)	4 to 12 (100 to 300)	135	A QR-EC	
	16 x 20 (4,9 x 6,1)	40 (151)	25 (1,72)	4 to 12 (100 to 300)	155	A QR-EC/EC	
	16 x 22 (4,9 x 6,7)	44 (167)	30 (2,06)	4 to 12 (100 to 300)	135	A QR-EC	
	16 x 22 (4,9 x 6,7)	44 (167)	30 (2,06)	4 to 12 (100 to 300)	155	A QR-EC/EC	
	16 x 24 (4,9 x 7,3)	48 (182)	36 (2,48)	4 to 12 (100 to 300)	135	A QR-EC	
	16 x 24 (4,9 x 7,3)	48 (182)	36 (2,48)	4 to 12 (100 to 300)	155	A QR-EC/EC	
EC ^(b)	16 x 16 (4,9 x 4,9)	32 (121)	16 (1,10)	4 to 12 (100 to 300)	135	A EC	5 mm
	16 x 16 (4,9 x 4,9)	32 (121)	16 (1,10)	4 to 12 (100 to 300)	175	A QR-EC/EC	3 mm
	16 x 18 (4,9 x 5,5)	36 (136)	20 (1,38)	4 to 12 (100 to 300)	135	A EC	5 mm
	16 x 18 (4,9 x 5,5)	36 (136)	20 (1,38)	4 to 12 (100 to 300)	175	A QR-EC/EC	3 mm
	16 x 20 (4,9 x 6,1)	40 (151)	25 (1,72)	4 to 12 (100 to 300)	135	A EC	5 mm
	16 x 20 (4,9 x 6,1)	40 (151)	25 (1,72)	4 to 12 (100 to 300)	175	A QR-EC/EC	3 mm
	16 x 22 (4,9 x 6,7)	44 (167)	30 (2,06)	4 to 12 (100 to 300)	135	A EC	5 mm
	16 x 22 (4,9 x 6,7)	44 (167)	30 (2,06)	4 to 12 (100 to 300)	175	A QR-EC/EC	3 mm
	16 x 24 (4,9 x 7,3)	48 (182)	36 (2,48)	4 to 12 (100 to 300)	135	A EC	5 mm
	16 x 24 (4,9 x 7,3)	48 (182)	36 (2,48)	4 to 12 (100 to 300)	175	A QR-EC/EC	3 mm



NOTES:

- For use in QR-EC and EC Light Hazard Occupancy automatic sprinkler system applications per FM installation standards. (Maximum room size: 1600 ft² (150 m²) except for corridors protected by one row of sprinklers. Minimum fire-resistance rating of room walls: 30 minutes.)
- For use in EC Light Hazard Occupancy automatic sprinkler system applications per FM installation standards. (Maximum room size: 1600 ft² (150 m²) except for corridors protected by one row of sprinklers. Minimum fire-resistance rating of room walls: 30 minutes.)
- FM requirement is based on maintaining both minimum flow and minimum pressure.
- The centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Ref. Figure A).
- For use under smooth level ceilings per FM installation standards.

TABLE A-2
FM APPROVAL CRITERIA FOR INSTALLATION OF
17/32 INCH ORIFICE MODEL A EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

FULLY RECESSED DIMENSIONS†

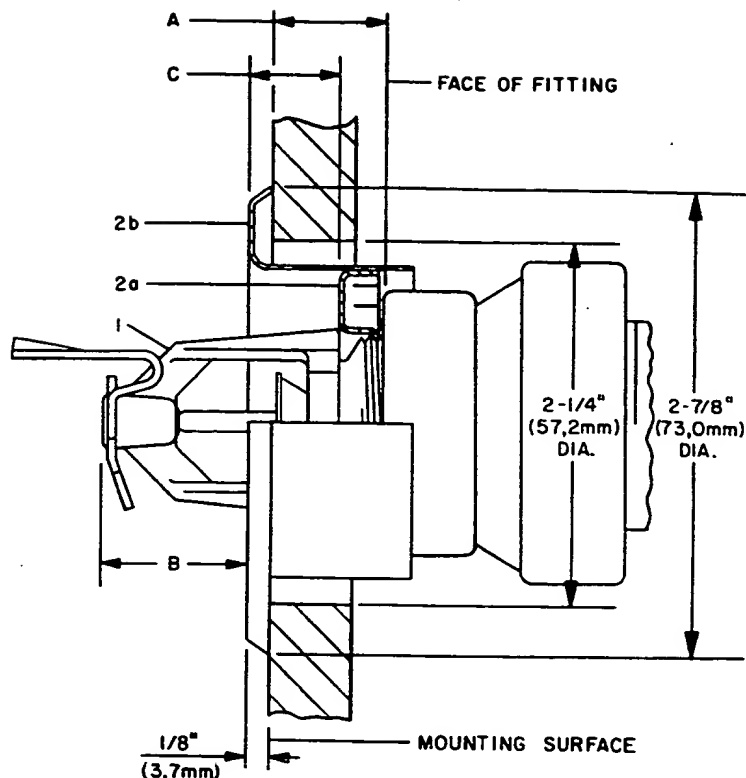
Up to 1/2 inch adjustment from minimum 1/4 inch to maximum 3/4 inch recessed position.

Dim.	Inches	mm
A-	5/8±1/8††	15,9±3,2
B-Min.	3/4	19,1
B-Nom.	1	25,4
B-Max.	1-1/4	31,8
C-Min.	1/4	6,4
C-Max.	3/4	19,1

HIGH ADJUSTMENT DIMENSIONS

Up to 3/4 inch adjustment from the flush sidewall position to 3/4 inch recessed position.

Dim.	Inches	mm
A-	1/2±1/4††	12,7±6,4
B-Min.	3/4	19,1
B-Nom.	1-1/8	28,6
B-Max.	1-1/2	38,1
C-Min.	FLUSH	—
C-Max.	3/4	19,1



† For best overall appearance.

†† Remaining 1/4 inch (6,4 mm) of adjustment can be used to compensate for variations in sprinkler make-in and fitting take-out.

- 1- Model A Extended Coverage Horizontal Sidewall Sprinkler
- 2- Model F700 Recessed Escutcheon
- a- Mounting Plate
- b- Closure

FIGURE B
MODEL A RECESSED EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLER WITH TWO-PIECE MODEL F700 RECESSED ESCUTCHEON

Temperature Rating*	Bulb Liquid Color
135°F/57°C	Orange
155°F/68°C	Red
175°F/79°C	Yellow

* Refer to Table E.

— TABLE B —
TEMPERATURE RATINGS FOR MODEL A EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

Sprinkler Finishes

Natural Brass
Chrome Plated
Polyester, All Colors

— TABLE C —
AVAILABLE FINISHES FOR THE MODEL A EXTENDED COVERAGE HORIZONTAL SIDEWALL SPRINKLERS

Escutcheon Finishes

Chrome Plated
Color Coated, All Colors

— TABLE D —
AVAILABLE FINISHES FOR THE MODEL F700 RECESSED ESCUTCHEON

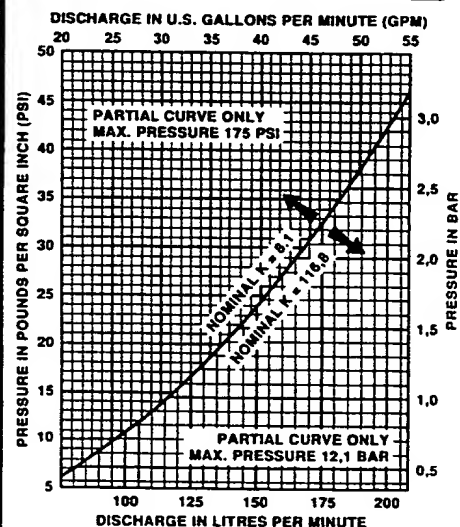


FIGURE C
NOMINAL DISCHARGE CURVE

fire protection system, prior to wall construction and/or application of a finish coat to the wall. They also permit refinishing of a wall surface without having to first shut down the fire protection system and remove the sprinklers.

The adjustment provided by the F700 substantially reduces the accuracy to which the length of fixed pipe nipples to the sprinklers must be cut. Also, the Closure has a 1/2 (12,7 mm) wide flange which provides ample clearance for covering the mounting hole.

APPROVALS AND STANDARDS

The 17/32 inch (20 mm) orifice Model A Extended Coverage Horizontal Sidewall Sprinklers and Recessed Extended Coverage Horizontal Sidewall Sprinklers are listed by Underwriters

Laboratories Inc. and Underwriters' Laboratories of Canada. They are approved by the Scientific Services Laboratory (Australia) and accepted by the City of New York under MEA241-94-E.

The 17/32 inch (20 mm) orifice Model A Extended Coverage Horizontal Side-

wall Sprinklers are approved by the Factory Mutual Research Corporation.

The laboratory listings and approval only apply to the service conditions indicated in the Technical Data and Design Criteria sections.

WARNING

The 17/32 inch orifice Model A Extended Coverage Horizontal Sidewall Sprinklers and Recessed Extended coverage Horizontal Sidewall Sprinklers described herein must be installed and maintained in compliance with this document, as well as applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.

Installation of Model A Extended Coverage Horizontal Sidewall Sprinklers in recessed escutcheons other than the F700 will void all sprinkler warranties, as well as possibly void the sprinkler's Approvals and/or Listings.

TECHNICAL DATA

The 17/32 inch (20 mm) orifice Model A Extended Coverage Horizontal Sidewall Sprinklers are rated for use at a maximum service pressure of 175 psi (12.1 bar). The available temperature ratings and finishes are given in Tables B and C, respectively.

Recessed versions of the Model A Extended Coverage Horizontal Sidewall Sprinkler are obtained by utilizing the Model A Sprinkler in combination with the Model F700 Recessed Escutcheon. Available finishes for the F700 Escutcheons are given in Table D.

The nominal discharge curve plotted in Figure C represents the flow "Q" in GPM (LPM) as determined by the following formula:

$$Q = K\sqrt{p}$$

where the nominal discharge coefficient "K" equals 8.1 (116.8); and, "p" equals the residual flowing pressure in psi (bar). Listing standards permit the actual value of "K" to vary from 7.4 to 8.2 (106.7 to 118.2); however, for hydraulic calculations, a K-factor of 8.1 (116.8) is to be applied.

The Frame of the Model A Sprinkler,

(Ref. Figure A), is brass per ASTM B176 (C87800), or a proprietary alloy designated as QM. The Button (bulb retainer) is phosphor bronze per ASTM B103 (C51000 or C52100). The Gas-ketted Spring Plate consists of a Beryllium Nickel (N03360) disc spring that is sealed on both its inside and outside faces with a Teflon[†] gasket. The Compression Screw is bronze per ASTM B140 (C31400) and the Deflector is brass per ASTM B36 (C22000). The QR-EC and QR-EC/EC Sprinklers utilize a 3 mm diameter frangible bulb, and the EC Sprinklers utilize a 5 mm diameter frangible bulb. Table B indicates the bulb liquid color as a function of temperature rating.

The F700 Recessed Escutcheon provided for use with the Model A Extended Coverage Horizontal Sidewall Sprinkler (Ref. Figure B) has a Closure and Mounting Plate fabricated from low carbon steel. The Mounting Plate prongs, which are compressed back into the Mounting Plate as the Closure is pushed over it, maintain a tight friction fit between the two pieces. The Mounting Plate and Closure can also swivel relative to each other and compensate for minor non-perpendicularity between the Model A Sprinkler and the wall.

DESIGN CRITERIA

The 17/32 inch orifice Model A Extended Coverage Horizontal Sidewall Sprinklers and Recessed Extended Coverage Horizontal Sidewall Sprinklers must only be installed and utilized in Light Hazard Occupancies, under smooth and level ceilings as defined in the applicable installation standard (e.g. NFPA 13), and in accordance with the criteria given in Table A-1 or A-2, as applicable. The nominal wetting patterns are illustrated in Figure D for the minimum flows required for typical coverage areas.

NOTES

For coverage area dimensions less than or between those indicated in Table A-1 or A-2, as applicable, it is necessary to use the minimum required flow for the next highest width (W) and length (L) for which installation criteria are stated.

The Model A Extended Coverage Horizontal Sidewall Sprinklers and Recessed Extended Coverage Horizontal Sidewall Sprinklers must NOT be used with obstructions to heat flow such as beams, joists, or ducts located within the sprinkler coverage area. They may be located along the boundaries separating adjacent sprinkler coverage areas.

Ceiling mounted obstructions such as

heating or air conditioning diffusers, overhangs, and light fixtures must be located above an elevation, as shown in Figure G, where they will not interfere with the proper distribution of water by the sprinkler.

INSTALLATION

NOTES

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontal, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch for the 135°F/57°C, 155°F/68°C, and 175°F/79°C temperature ratings. (At higher ambient temperatures, the bubble may be barely perceptible for the lower temperature ratings.)

Installation of Model A Extended Coverage Horizontal Sidewall Sprinklers in recessed escutcheons other than the F700 will void all sprinkler warranties, as well as possibly void the sprinkler's Approvals and/or Listings.

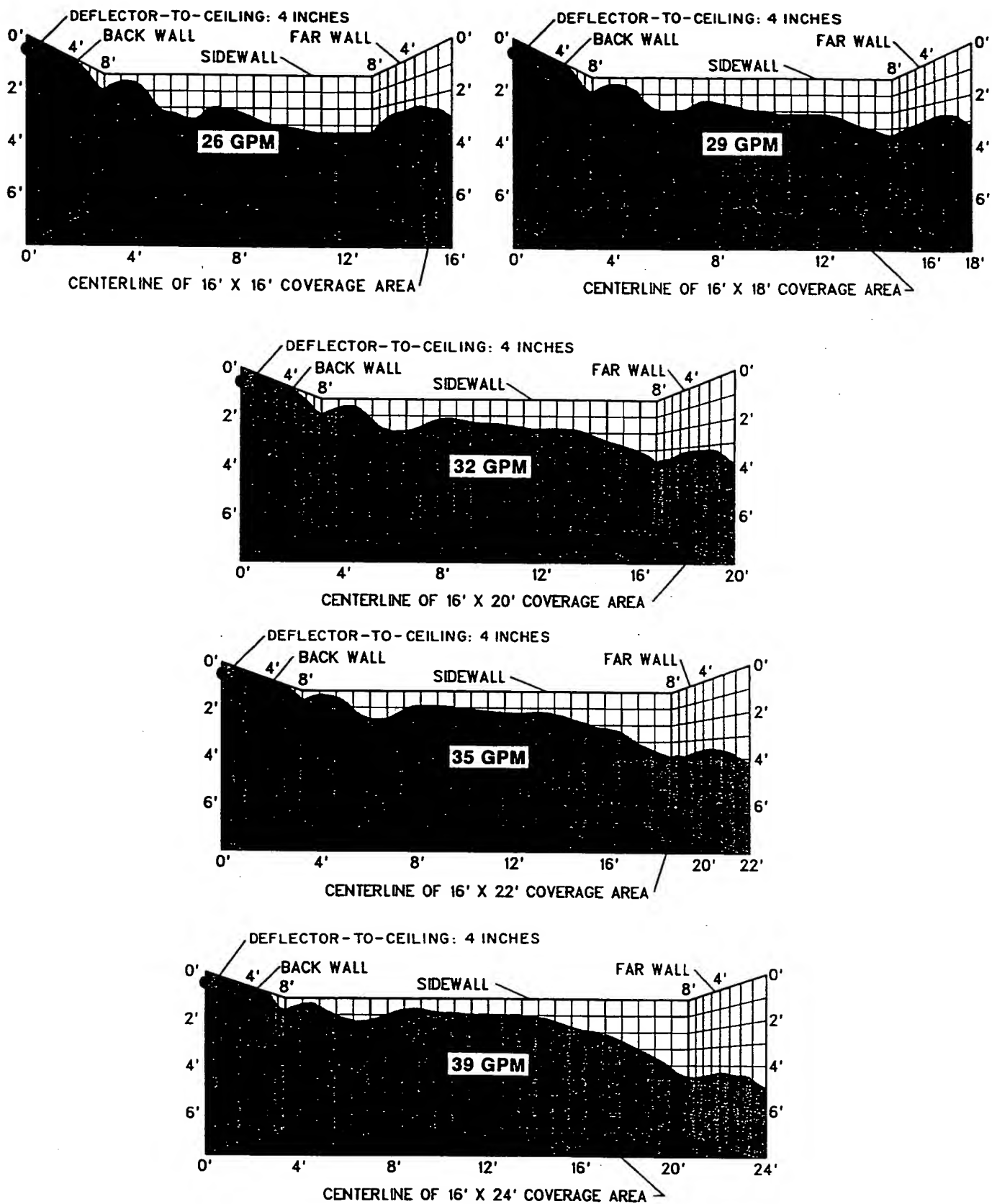
Model A Extended Coverage Horizontal Sidewall Sprinklers and Recessed Extended Coverage Horizontal Sidewall Sprinklers must be installed in accordance with the following instructions.

1. Prior to installing the sprinklers and if applicable, verify that the outer face of the sprinkler fitting is within the proper range of distance which can be accommodated by the type of escutcheon being used.

When installing a Model A Horizontal Sidewall Sprinkler with the F700 Recessed Escutcheon, for best overall appearance, use Dimension A indicated under the "Fully Recessed Dimensions" heading of Figure B. Otherwise, use Dimension A under the "High Adjustment Dimensions" heading. In either case, the remaining escutcheon plate adjustment can then be used to compensate for the possible manufacturing variations in the take-out of the fittings, as well as in the make-in of the sprinklers (as permitted by ANSI B1.20.1).

2. The Model A Horizontal Sidewall Sprinklers must be installed with the centerline of the waterway parallel to the ceiling and perpendicular to a backwall surface.

It is recommended that a lightweight spirit level (less than 1 pound), be used to level the sprinkler fitting, as shown in Figure F and that a square be used to check perpendicularity of



NOTES:

1. Pattern shown with no ceiling mounted obstructions.
2. See Design Criteria and Warranty Sections.

**FIGURE D
NOMINAL WETTING PATTERNS AT UL AND ULC LISTED
MINIMUM FLOW RATE CONDITIONS**

SELECTION:

Select the appropriate wrench based on the following requirements:

- Model A Sprinklers with a natural brass or chrome plated finish and where the Wrench Flats (as shown in Figure A) are accessible, may be installed with an 8 or 10 inch adjustable Crescent type wrench or the Model F850 Sprinkler Wrench.
- Model A Sprinklers with a polyester coated finish must only be installed with the Model F850 Sprinkler Wrench.
- Model A Recessed Sprinklers which are to be installed after completion of the wall must be installed with the Model F850 Sprinkler Wrench.

USE:

When using an 8 or 10 inch adjustable Crescent type wrench, the wrench is to be applied to the sprinkler wrench flats only (Ref. Figure A).

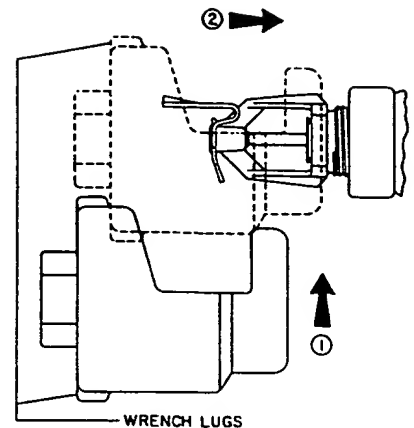
To use the F850 Sprinkler Wrench, slip the Wrench opening over the Model A Sprinkler Deflector by passing the Sprinkler Wrench up from beneath the sprinkler as shown in the adjacent illustration.

Using a 1/2 inch ratchet drive or by applying an 8 or 10 inch adjustable wrench to the hex end of the Sprinkler Wrench, tighten the sprinkler into the fitting. The two lugs located on opposite sides of the Wrench indicate the orientation of the sprinkler frame arms.

NOTE

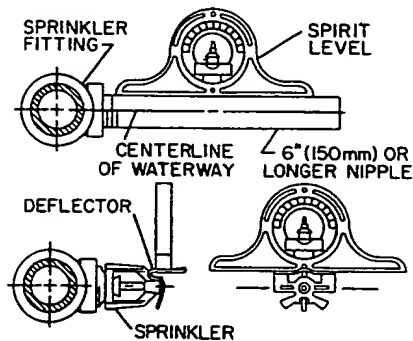
Push on the Sprinkler Wrench, while it is being turned, to ensure that the Wrench recess stays fully engaged with the sprinkler wrench flats.

Carefully remove the Sprinkler Wrench by disengaging it from the sprinkler wrench flats, and then lowering it down over the sprinkler deflector.



Model F850 Nylon Coated Sprinkler Wrench

**FIGURE E
SPRINKLER WRENCH SELECTION AND USE**

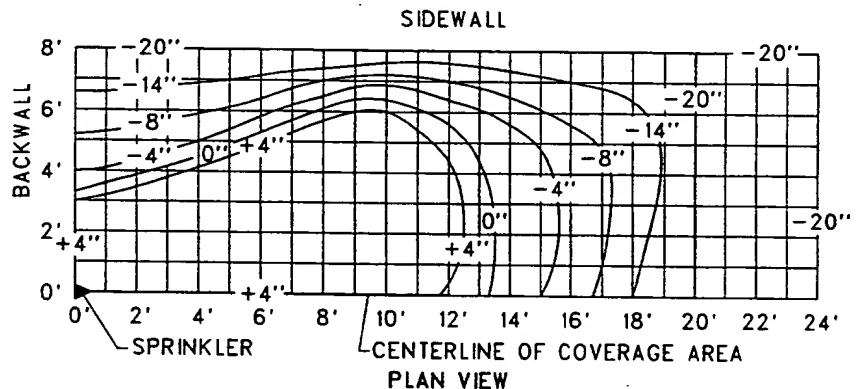


**FIGURE F
LEVELING OF
SPRINKLER FITTING
AND DEFLECTOR**

the waterway centerline to the mounting surface.

- After installing the F700 Mounting Plate (or other escutcheon, as applicable escutcheon) over the sprinkler threads, apply pipe thread sealant sparingly to the sprinkler threads only. Use of a Teflon[®] based pipe joint sealant is recommended.
- Hand tighten the sprinkler into the sprinkler fitting.
- Refer to Figure E and select the appropriate Sprinkler Wrench to tighten the sprinkler into the fitting. The word "TOP" on the Deflector must face upwards towards the ceiling.

The F850 Sprinkler Wrench must be used for installing polyester coated



NOTES:

- For a given position within the coverage area, ceiling mounted obstructions must not hang below the elevation dimension given in the graph.
- Elevation dimensions are perpendicular to the plane of the Deflector Hat (ref. Fig. A), where positive (+) dimensions are above the plane of the Deflector Hat and negative (-) dimensions are below. (Reference: the Deflector Hat is 7/16" (11.1 mm) above the sprinkler centerline of waterway.)

**FIGURE G
ALLOWABLE ELEVATION FOR CEILING MOUNTED OBSTRUCTIONS
SUCH AS HEATING OR AIR CONDITIONING DIFFUSERS, OVERHANGS,
AND LIGHT FIXTURES**

sprinklers, in order to prevent damage to the sprinkler finish.

NOTES

A leak tight 3/4 inch NPT sprinkler joint should be obtained with a torque of 10 to 20 ft.lbs. (13.6 to 27.1 Nm). A maximum 30 ft. lbs. (40.7 Nm) of torque is to be used to install sprinklers. Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to make-up for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Readjust the position of the sprinkler fitting to suit.

It is recommended that a lightweight spirit level (less than 1 pound), be used to level the sprinkler Deflector, as shown in Figure F.

NOTE

The Deflector is angled forward;

PSN 57 — XXX — X — XXX

MODEL		SPRINKLER FINISH		TEMPERATURE RATING	
396	A QR-EC (3 mm Bulb)	1	NATURAL BRASS	135	135°F/57°C (A QR-EC & A EC ONLY)
396	A QR-EC/EC (3 mm Bulb)	4	WHITE POLYESTER	155	155°F/68°C (A QR-EC/EC & A EC ONLY)
596	A EC (5 mm Bulb)	9	CHROME PLATED	175	175°F/79°C (QR-EC/EC ONLY)

TABLE E
PRODUCT SYMBOL NUMBER SELECTION
FOR 17/32 INCH ORIFICE MODEL A EXTENDED COVERAGE
HORIZONTAL SIDEWALL SPRINKLERS
WITH 3/4 INCH NPT CONNECTION

consequently, the spirit level must be carefully positioned left-to-right when using it to level the Deflector.

6. In recessed horizontal sidewall sprinkler installations, after the wall has been installed or the finish coat has been applied, slide on the F700 Closure over the Model A Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the wall.

CARE AND MAINTENANCE

Automatic sprinklers must never be shipped or stored where their temperatures will exceed 100°F/38°C and they must never be painted, plated, coated or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinkler — both before and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (ref. Installation Section Note.)

NOTES

Absence of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

Before closing a fire protection system control valve for maintenance work on

the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

It is recommended that automatic sprinkler systems be inspected quarterly by a qualified Inspection Service.

WARRANTY

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

The data provided in Figure D is not intended for use as a minimum wetting pattern specification.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

A Product Symbol Number (PSN) is not specified when ordering polyester coated Model A Sprinklers with other than a white color; when ordering color coated Model F700 Recessed Escutcheons with other than a white color; or when ordering sprinklers with thread connections per ISO 7/1. It is suggested that a color chip be provided when ordering special color finishes. Otherwise, responsibility for duplication cannot be accepted.

Contact your local distributor for availability.

"Standard Order" Sprinkler Assemblies with NPT Thread Connections:

**Model A QR-EC (3 mm bulb)
Sprinklers:**
Specify: 17/32" orifice, 135°F, Model A QR-EC Horizontal Sidewall Sprinkler with (specify type) finish, PSN (specify from Table E).

**Model A QR-EC/EC (3 mm bulb)
Sprinklers:**
Specify: 17/32" orifice, (temperature rating: 155°F or 175°F), Model A QR-EC/EC Horizontal Sidewall Sprinkler with (specify type) finish, PSN (specify from Table E).

**Model A EC (5 mm bulb)
Sprinklers:**
Specify: 17/32" orifice, (temperature rating: 135°F or 155°F), Model A EC Horizontal Sidewall Sprinkler with (specify type) finish, PSN (specify from Table E).

"Special Order" Sprinkler Assemblies with ISO 7/1 Thread Connections:

**Model A QR-EC (3 mm bulb)
Sprinklers:**
Specify: 17/32" orifice, 135°F, Model A QR-EC Horizontal Sidewall Sprinkler with (specify type) finish and with thread connection per ISO 7/1.

**Model A QR-EC/EC (3 mm bulb)
Sprinklers:**
Specify: 17/32" orifice, (temperature rating: 155°F or 175°F), Model A QR-EC/EC Horizontal Sidewall Sprinkler with (specify type) finish and with thread connection per ISO 7/1.

**Model A EC (5 mm bulb)
Sprinklers:**
Specify: 17/32" orifice, (temperature rating: 135°F or 155°F), Model A EC Horizontal Sidewall Sprinkler with (specify type) finish and with thread connection per ISO 7/1.

Recessed Escutcheon:
Specify: 3/4" (19 mm) Model F700 Recessed Escutcheon with (specify finish), PSN (specify).

3/4" (19 mm) F700
Chrome Plated PSN 56-700-9-010
3/4" (19 mm) F700
White Color
Coated PSN 56-700-4-010

Sprinkler Wrench:
Specify: Model F850 Sprinkler Wrench, PSN 56-850-4-001.



HORIZONTAL SIDEWALL SPRINKLERS

140°F RES/QR-EC & 165°F RES/QR-EC/EC

MODEL FR-1, FAST RESPONSE SOLDER TYPE, 17/32" (20 mm) ORIFICE

GENERAL DESCRIPTION

The 17/32 inch (20 mm) orifice, Model FR-1 140°F RES/QR-EC & 165°F RES/QR-EC/EC Horizontal Sidewall Sprinklers (Ref. Figure A) are automatic sprinklers of the fusible solder type. They are intended to be used in

- wet pipe residential sprinkler systems for one- and two-family dwellings and mobile homes per NFPA 13D,
- wet pipe residential sprinkler systems for residential occupancies up to four stories in height per NFPA 13R,
- wet pipe sprinkler systems for the residential portions of any occupancy per NFPA 13,
- light hazard, quick response — extended coverage (QR-EC) sprinkler system applications per NFPA 13 or FM installation standards, or
- light hazard, extended coverage (EC) sprinkler system applications per NFPA or FM installation standards.

They are designed for installation along a wall or lintel and just beneath a smooth ceiling. Horizontal sidewall sprinklers are generally used in lieu of pendent or upright sprinklers because of aesthetic, building construction, or installation economy considerations.

The FR-1 Sprinklers have been designed to operate with a particular fusible element temperature rating and heat sensitivity characteristic, as well as to discharge water in a specific pattern and quantity per square foot relationship. The combination of the performance characteristics which are associated with the FR-1 Sprinklers have been proven to help in the control of residential type fires and, therefore, to improve the chance for occupants to escape or be evacuated.

Fire sprinkler systems are not a substitute for intelligent fire safety awareness or construction materials and practices required by building codes.

APPROVALS AND STANDARDS

The 17/32 inch (20 mm) orifice, Model FR-1 Horizontal Sidewall Sprinklers

Components:

- 1 - Frame
- 2 - Strut
- 3 - Deflector
- 4 - Hook
- 5 - Link Assembly
- 6 - Ejection Spring
- 7 - Button
- 8 - Gasketed Spring Plate

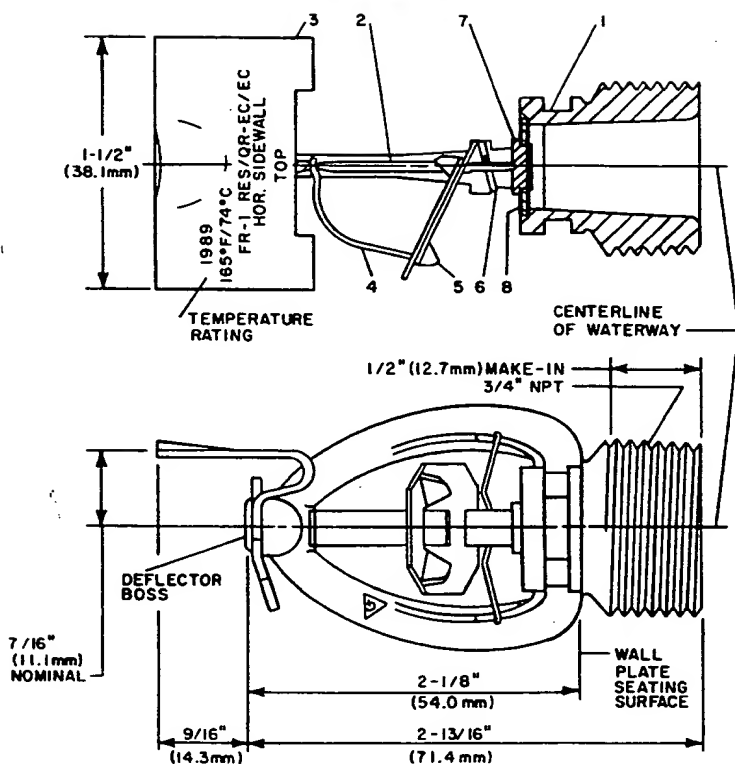
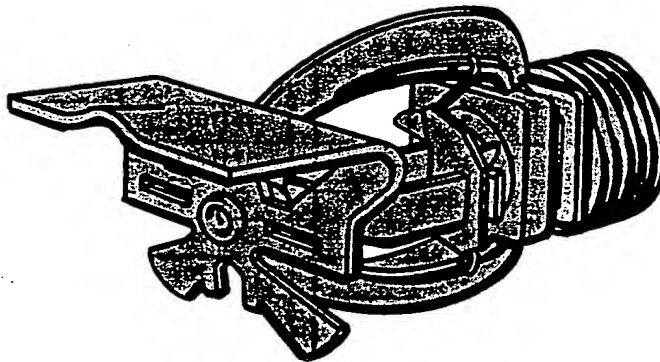


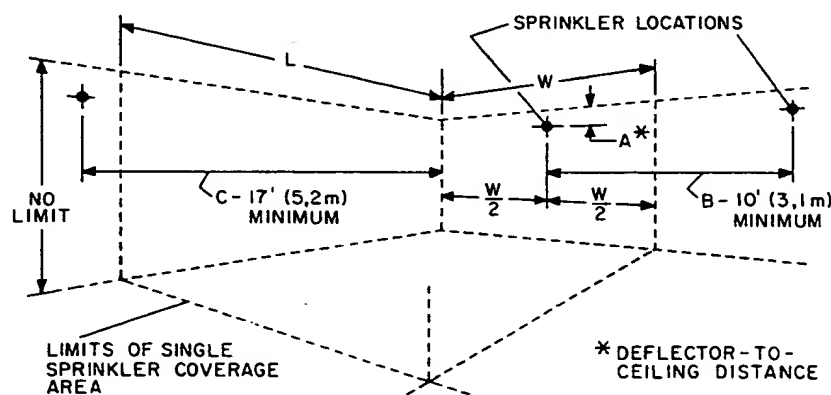
FIGURE A
17/32 INCH (20 mm) ORIFICE MODEL FR-1
140°F RES/QR-EC & 165°F RES/QR-EC/EC
HORIZONTAL SIDEWALL SPRINKLERS

are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada, and they are approved by Factory Mutual Research Corporation. The listings only apply to the service conditions indicated in the General Technical Data and Installation/Usage sections.

The 17/32 inch (20 mm) orifice, Model FR-1 Horizontal Sidewall Sprinklers are accepted by the City of New York under MEA 39-92-M.

Any questions concerning an interpretation of NFPA 13, 13D, or 13R sprinkler system design/installation stan-

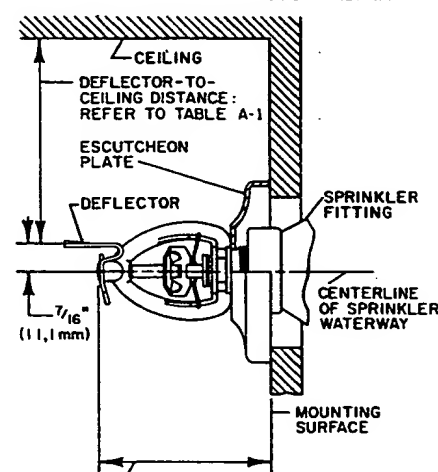
APPLICATION	COVERAGE AREA W x L FT. x FT. (m x m)	MINIMUM FLOW ^(d) GPM (LPM)	MINIMUM PRESSURE ^(d) PSI (BAR)	DEFLECTOR-TO- CEILING DISTANCE A ^(f) INCHES (mm)	SPRINKLER TEMP. RATING °F	MAX. CEILING SLOPE ^(g) IN./FT. (mm/m)
RES ^(a)	12 x 12 (3,7 x 3,7)	26/24 (98/91) ^(e)	10.3/8.8 (0,71/0,61) ^(e)	4 to 8 (100 to 200)	140, 165	0
	16 x 20 (4,9 x 6,1)	50/45 (189/170) ^(e)	38.1/30.9 (2,63/2,13) ^(e)	4 to 8 (100 to 200)	140, 165	0
QR-EC ^(b)	16 x 16 (4,9 x 4,9)	26 (98)	10.3 (0,71)	4 to 8 (100 to 200)	140, 165	0
	16 x 18 (4,9 x 5,5)	29 (110)	12.8 (0,88)	4 to 8 (100 to 200)	140, 165	0
	16 x 18 (4,9 x 5,5)	38 (144)	22.0 (1,52)	4 to 18 (100 to 450)	140, 165	0
	16 x 20 (4,9 x 6,1)	34 (129)	17.6 (1,21)	4 to 8 (100 to 200)	140, 165	2 (166)
	16 x 20 (4,9 x 6,1)	45 (170)	30.9 (2,13)	4 to 18 (100 to 450)	140	0
	14 x 22 (4,3 x 6,7)	37 (140)	20.9 (1,44)	4 to 8 (100 to 200)	140, 165	0
	16 x 22 (4,9 x 6,7)	37 (140)	20.9 (1,44)	4 to 8 (100 to 200)	140	0
	16 x 24 (4,9 x 7,3)	44 (167)	29.5 (2,03)	4 to 8 (100 to 200)	140	0
	18 x 16 (5,5 x 4,9)	31 (117)	14.6 (1,01)	4 to 8 (100 to 200)	140, 165	0
	18 x 18 (5,5 x 5,5)	33 (125)	16.6 (1,14)	4 to 8 (100 to 200)	140, 165	0
	20 x 16 (6,1 x 4,9)	35 (133)	18.7 (1,29)	4 to 8 (100 to 200)	140, 165	0
EC ^(c)	16 x 20 (4,9 x 6,1)	45 (170)	30.9 (2,13)	4 to 18 (100 to 450)	165	0
	16 x 22 (4,9 x 6,7)	37 (140)	20.9 (1,44)	4 to 8 (100 to 200)	165	0
	16 x 24 (4,9 x 7,3)	44 (167)	29.5 (2,03)	4 to 8 (100 to 200)	165	0



NOTES:

- Wet pipe fire sprinkler systems in the residential portions of any occupancy per NFPA 13, in one- and two- family dwellings and mobile homes per NFPA 13D, or residential occupancies per NFPA 13R.
- For use in QR-EC and EC Light Hazard Occupancy automatic sprinkler system applications per NFPA 13.
- For use in EC Light Hazard Occupancy automatic sprinkler system applications per NFPA 13.
- UL and ULC requirements are based on minimum flow in GPM from each sprinkler. The residual pressures are indicated for reference purposes and are based on a nominal K-factor of 8.1 (116,8).
- Single Head/Multiple Head flow rates [for example: the minimum single sprinkler flow rate is 26 GPM (98 LPM) and the minimum multiple sprinkler flow rate is 24 GPM (91LPM) per sprinkler for a maximum coverage area of 12' x 12' (3,7 m x 3,7 m)]. Refer to Hydraulic Design Criteria under Residential Installation/Usage Criteria Section for details.
- The centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Ref. Figure A).
- Ceiling is to slope downwards from the wall on which the sprinkler is located.

TABLE A-1
UL AND ULC LISTING CRITERIA FOR INSTALLATION
OF THE 17/32 INCH (20 mm) ORIFICE
MODEL FR-1 HORIZONTAL SIDEWALL SPRINKLERS



2 to 6" (50 to 150 mm)
EXCEPT THAT DISTANCE IS TO BE
2 to 3" (50 to 75 mm)
FOR SOFFIT MOUNTING IN
RESIDENTIAL APPLICATIONS

FIGURE B-1
WALL MOUNTING DIMENSIONS
FOR INSTALLATIONS PER
NFPA STANDARDS

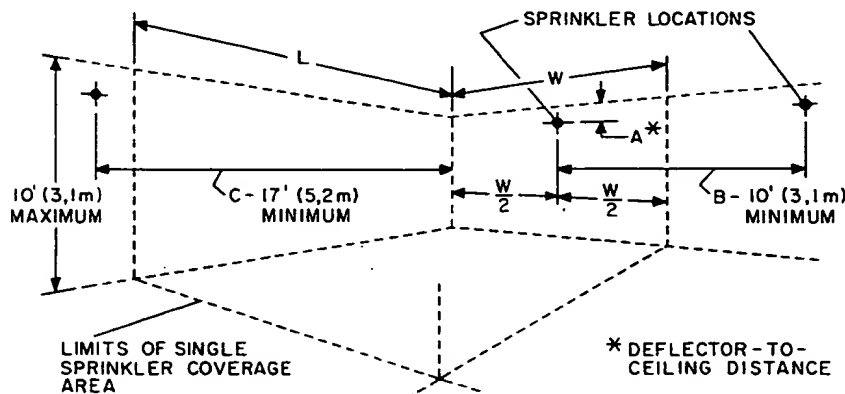
standards, as well as requests for system design/installation standards not presently covered by NFPA 13, 13D, or 13R, should be addressed to the:

Secretary, Standards Council
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

WARNINGS

The Model FR-1 Horizontal Side-wall Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applica-

APPLICATION	COVERAGE AREA W x L FT. x FT. (m x m)	MINIMUM FLOW ^(b) GPM (LPM)	MINIMUM PRESSURE ^(b) PSI (BAR)	DEFLECTOR-TO- CEILING DISTANCE A ^(c) INCHES (mm)	SPRINKLER TEMP. RATING °F	MAX. CEILING SLOPE IN./FT. (mm/m)
QR-EC ^(a)	16 x 16 (4,9 x 4,9)	32 (121)	16 (1,10)	4 to 12 (100 to 300)	165	1 (83)
	16 x 18 (4,9 x 5,5)	36 (136)	20 (1,38)	4 to 12 (100 to 300)	165	1 (83)
	16 x 20 (4,9 x 6,1)	40 (151)	25 (1,72)	4 to 12 (100 to 300)	165	1 (83)
	16 x 22 (4,9 x 6,7)	44 (167)	30 (2,06)	4 to 12 (100 to 300)	165	1 (83)
	16 x 24 (4,9 x 7,3)	48 (182)	36 (2,48)	4 to 12 (100 to 300)	165	1 (83)



NOTES:

- (a) For use in QR-EC and EC Light Hazard Occupancy automatic sprinkler system applications per FM installation standards. (Maximum room size: 1600 ft² (150 m²) except for corridors protected by one row of sprinklers. Minimum fire-resistance rating of room walls: 30 minutes.)
- (b) FM requirement is based on maintaining both minimum flow and minimum pressure.
- (c) The centerline of the sprinkler waterway is located 7/16 inch (11,1 mm) below the deflector (Ref. Figure A).

TABLE A-2
FM APPROVAL CRITERIA FOR INSTALLATION
OF THE 17/32 INCH (20 mm) ORIFICE
MODEL FR-1 HORIZONTAL SIDEWALL SPRINKLERS

ble standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

Because of the above cited stipulations and the varied nature of residential type architecture, there will be some compartment designs which cannot be fully sprinklered in accordance with the recommendations of NFPA 13, 13D, or 13R. In the event of this condition, consult the authorities having jurisdiction for guidance.

It is the responsibility of an installing contractor to provide a copy of this document to the owner or his representative and, in turn, it is the obligation of the owner to provide a copy of this document to a succeeding owner.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufac-

turer should be contacted relative to any questions.

GENERAL TECHNICAL DATA

Sprinkler Assemblies:

The 17/32 inch (20 mm) orifice, Model FR-1 Horizontal Sidewall Sprinklers are available in 140°F/57°C (RES/QR-EC) and 165°F/74°C (RES/QR-EC/EC) temperature ratings with natural brass or chrome plated finishes. The Link Assembly for both finishes is provided with a black coating, for minimum obtrusiveness. The FR-1 Sprinklers are rated for use at a maximum service pressure of 175 psi (12,1 bar).

The nominal discharge curve plotted in Figure C represents the flow "Q" in GPM (LPM) as determined by the formula:

$$Q = K\sqrt{p}$$

where the nominal discharge coefficient "K" equals 8.1 (116,8); and, "p" equals the residual flowing pressure in psi (bar). Listing standards permit the

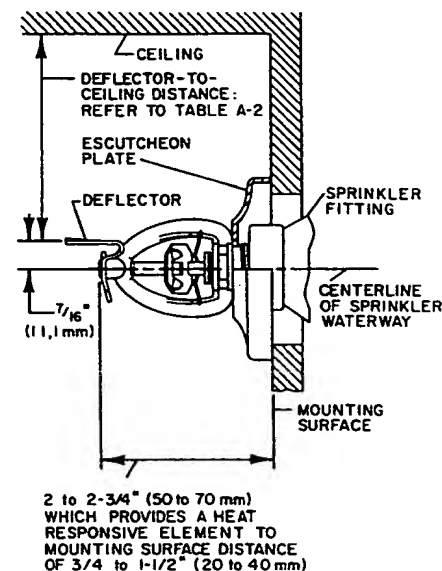


FIGURE B-2
WALL MOUNTING DIMENSIONS
FOR INSTALLATIONS PER
FM STANDARDS

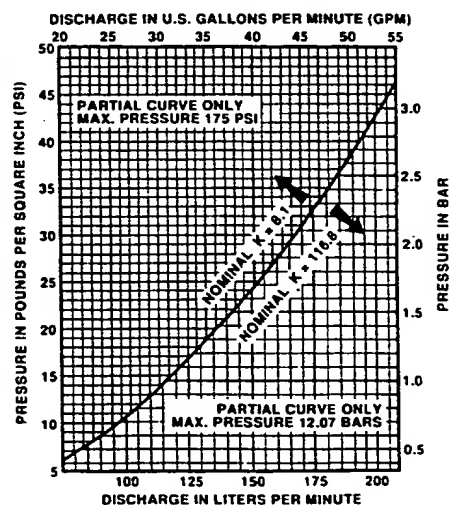
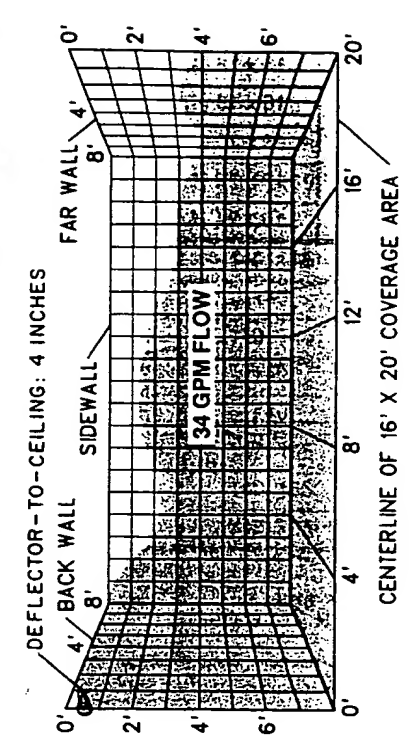
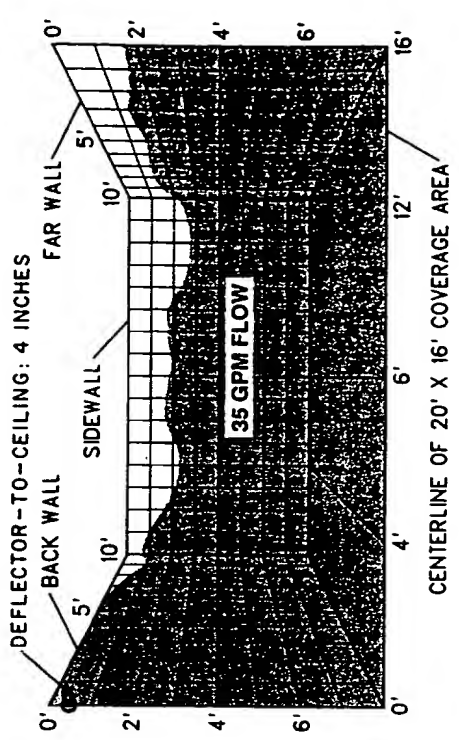
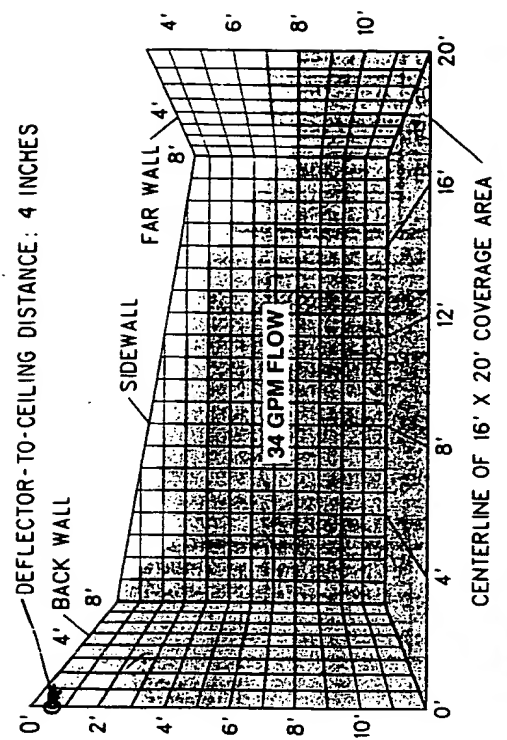
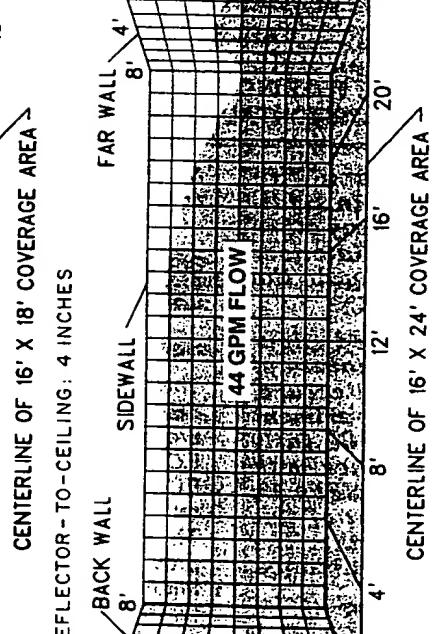
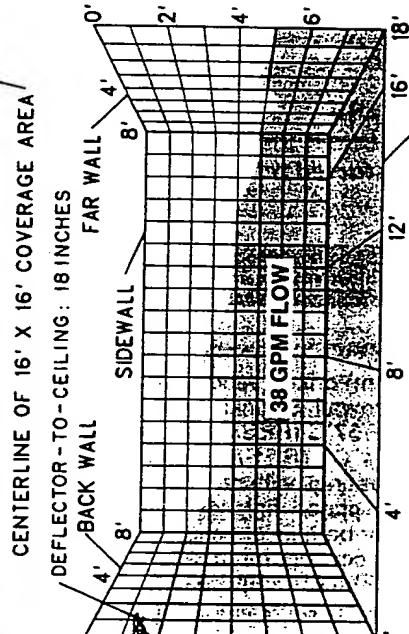
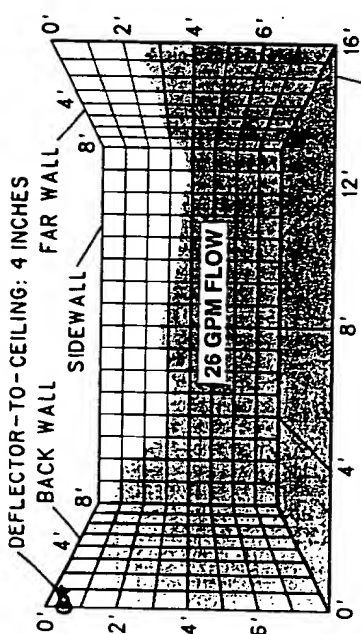


FIGURE C
NOMINAL DISCHARGE CURVE

actual value of K to vary from 7.4 to 8.2 (106,7 to 118,2).

The Frame of the FR-1 is a die cast bronze per ASTM B176 (C87800). The



NOTES:
 1. Patterns shown with no ceiling mounted obstructions.
 2. See QR-EC & EC Installation/Usage Criteria and Warranty Sections.

FIGURE D
NOMINAL WETTING PATTERNS AT UL AND ULC LISTED MINIMUM FLOW RATES
FOR REPRESENTATIVE QR-EC AND EC APPLICATIONS